

# MOTOR AGE



JUNE 5, 1913  
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NEW YORK

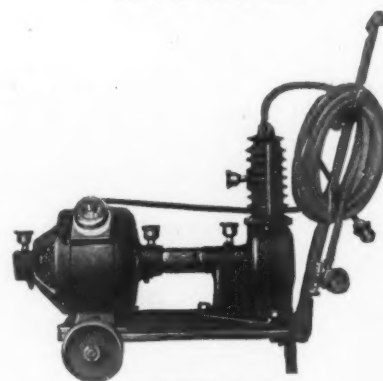
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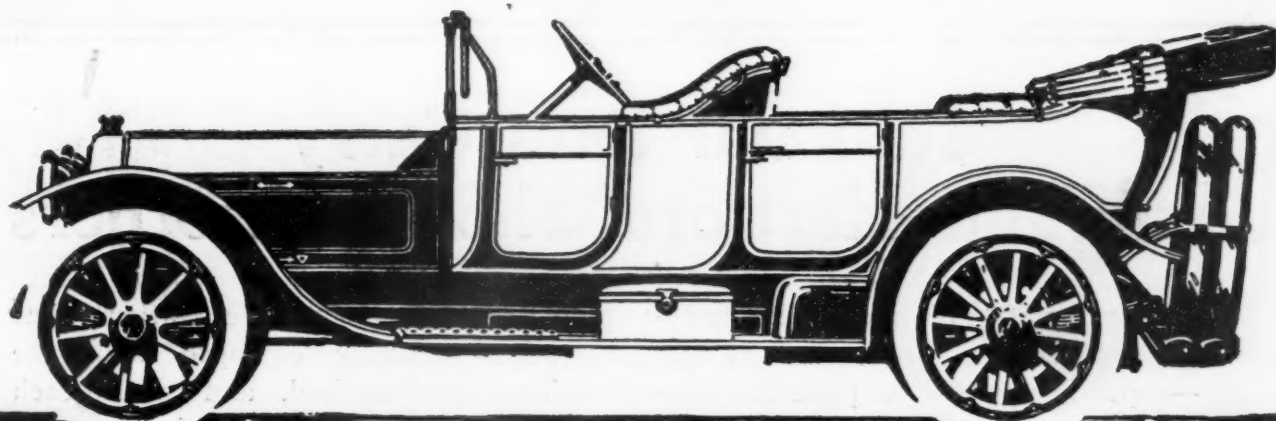
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## PEERLESS NEW MODELS

### Again First in Beauty and Safety

**T**HROUGH the development of details these Peerless New Models reach the highest point yet attained in motor car construction.

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	Touring	Torpedo	Limousine	Landaulet	Berline-Limousine
"38-Six"	\$4300	\$4300	\$5300	\$5400	\$5500
"48-Six"	\$5000	\$5000	\$6000	\$6100	\$6200
"60-Six"	\$6000	\$6000	\$7000	\$7100	\$7200
"38-Six" Roadster	\$4300		"38-Six" Coupe	\$5000	

The Peerless Motor Car Company, Cleveland, Ohio

Dealers also of Peerless Trucks

**Peerless**  
ALL  
THAT THE  
NAME IMPLIES

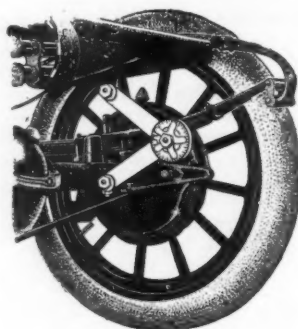
# National Cars Carry Truffault-Hartford Shock Absorbers

Winning the 500-mile race in Indianapolis in 1911—winning it again in 1912—capturing prize after prize in grueling speed tests—establishing the straightway mile record for stock cars—and recently running away with the victory of the 264-mile West Hudson-Catskill Auto Run, the National car has come justly by its title of the "International Champion."

Many of these races were run and won by stock cars, and in each case the car was equipped with Truffault-Hartford Shock Absorbers. Each victory of a National, whether a stock chassis or a special model, has been a victory too for the Truffault-Hartford Shock Absorber.

These victories have strengthened the confidence of the National Motor Vehicle Co. in the Truffault-Hartford and made even greater the motorists' demand.

Famous National drivers who have driven at whirlwind speed to glorious victory have generously conceded the help of the Truffault-Hartford—as a safeguard against spring and axle breakage—as a real factor in their personal safety.



Catalog on request

For several seasons the National has been regularly equipped with the Truffault-Hartford, and while each season witnesses certain advancements in its design and equipment, the builders have seen fit to adhere to Truffault-Hartford Shock Absorbers.

These facts are not without a great deal of meaning, especially to the manufacturer who believes that the best car equipment is as necessary to his ultimate success as the best car construction.

There are now 25 leading cars representing the most advanced ideas in construction and equipment that come out of their factories already equipped with the

***Truffault-Hartford***  
**SHOCK ABSORBER**  
*"The Pioneer Shock Absorber"*

The builders of these cars have thoroughly satisfied themselves by laboratory tests of the greater efficiency of the Truffault-Hartford. In including this equipment they are supplying their dealers with a talking point of intrinsic sales-merit.

**Insist Upon Truffault-Hartfords on Your New Car**

**HARTFORD SUSPENSION CO.**

EDWARD V. HARTFORD, Pres.

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Manufacturers of Hartford Electric Starting and Lighting System



# MOTOR AGE

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# The ELECTRIC DISCO System

## STARTING—LIGHTING

### Motor Car Builders Won't Make This Costly Mistake Again

Some makers of motor cars had to learn by **experience** that it doesn't pay to equip with just any electric starter.

They won't make such an expensive mistake again.

Henceforth they will look into this Electric Starter Proposition **carefully** and give it the consideration it deserves.

They will perceive that, even though it costs them more to put on the very finest electric starter, they save money by doing it.

The manufacturer who equips with the **Electric Disco** doesn't have to hire an army of mechanical experts to travel around the country fixing his customers' cars.

For the **Electric Disco** not only works perfectly when new, but **keeps on** delivering satisfaction.

A number of the leading manufacturers have

closed with The Disco Company for equipment for their 1914 cars. Watch for the 1914 announcements of motor builders and note the preponderance of cars that will be equipped with the Disco for 1914. They all appreciate, after having had some experience, the value of using this device.

### Spinning vs. Turning

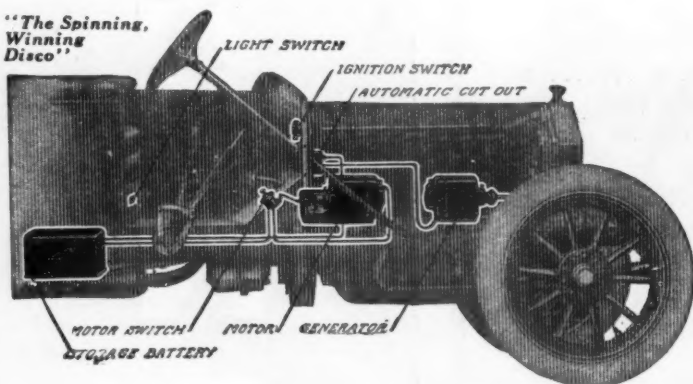
Observe the Electric Disco on your friend's car.

Note how it **spins** his motor.

It doesn't merely turn over the engine. It makes the engine fairly "whiz." Gives an immediate speed of 150 R. P. M.

Think what that spinning means when your motor is dead and the oil is stiff. There's no delay nor wait. The very **moment** you press the button you are **under way**.

"The Spinning, Winning Disco"



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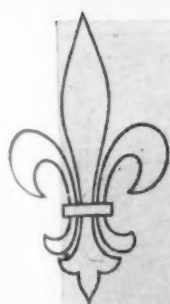
We have a handsome, new book on Electric Starters. We are sending a copy of it to every motorist we know. Over 15,000 motorists have already sent for it and have been able to immediately appreciate the supremacy of the Disco, and their demand to the manufacturer and dealer is working a tremendous effect on the equipment for 1914.

If you haven't received your copy it is because you have not sent your address. Please do so at once. We will forward the book by return mail.

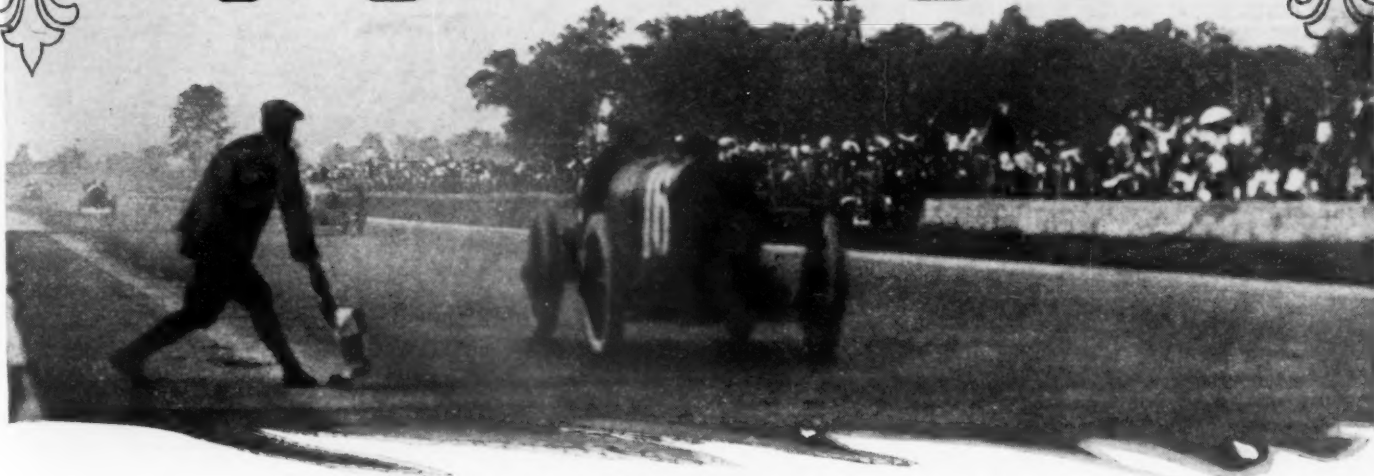
## The Disco Company

710 Dodge Building

DETROIT, U. S. A.



# MOTOR AGE



GOUX CROSSING THE TAPE FOR THE LAST TIME

## Speedway Honors Go to French Car

Jules Goux in Peugeot Wins 500-Mile Race at Indianapolis

INDIANAPOLIS, Ind., May 31—Coming to America with the title of "the fastest car in Europe," the Peugeot yesterday added to its laurels by winning the third annual 500-mile race on the big brick oval and Jules Goux, holder of the 1-hour world's record, sails for home June 10 with \$20,000 in cash given him by the speedway management, a few thousand more picked up from accessory concerns and three American trophies—the \$10,000 Wheeler & Schebler cup for leading at 400 miles; the Prest-O-Lite trophy, valued at \$2,500, for leading at 300 miles, and the \$2,500 Remy trophy for being first to catch the judges' eyes at the 200-mile post. Besides he received accessory money.

### Ten Cars Finish

This rich plunder goes to the wiry little Frenchman because he led home the finest field of starters that ever took part in the annual event at the speedway. Twenty-seven cars started, ten got the checkered flag, one other was

### THE DIVIDERS OF THE SPOILS

No.	Car	Driver	Time	M. P. H.	Prize
16	Peugeot	Goux	6:35:05.00	75.92	\$20,000
22	Mercer	Wishart	6:48:13.40	73.49	10,000
2	Stutz	Merz	6:48:49.25	73.38	5,000
9	Sunbeam	Guyot	7:02:58.95	70.92	3,500
23	Mercedes-Knight	Pilette	7:20:13.00	68.14	3,000
12	Gray Fox	Willcox	7:23:26.55	67.65	2,200
29	Mercedes	Mulford	7:28:05.50	66.95	1,800
31	Case	Disbrow	7:29:09.00	63.08	1,600
35	Mason	Haupt	7:52:35.10	63.47	1,500
25	Tulsa	Clark	7:56:14.25	62.99	1,400

By C. G. Sinsabaugh



GOUX AFTER THE RACE AND HIS CAR

running still at the end, while sixteen had dropped by the wayside for one reason or another.

### America's Showing

Notwithstanding this clean sweep made by Goux, America still has much of which to be proud, one of which facts is that the 500-mile record of 78.7 miles per hour, made last year by Joe Dawson in the National, was not beaten, Goux's average being 75.92 miles per hour. Also there is just reason for an exhibition of national pride in the fact that American cars finished second and third, beating out the seven others of European construction that were sent away at 10 o'clock by Starter Root. Also it is worthy of note that it was the Stutz and Keeton that pushed the invader and not the English Sunbeam, the two German Mercedes and the three Italian Isottas.

Only for hard luck there might have been a different story to tell and tradition might have been borne out through the

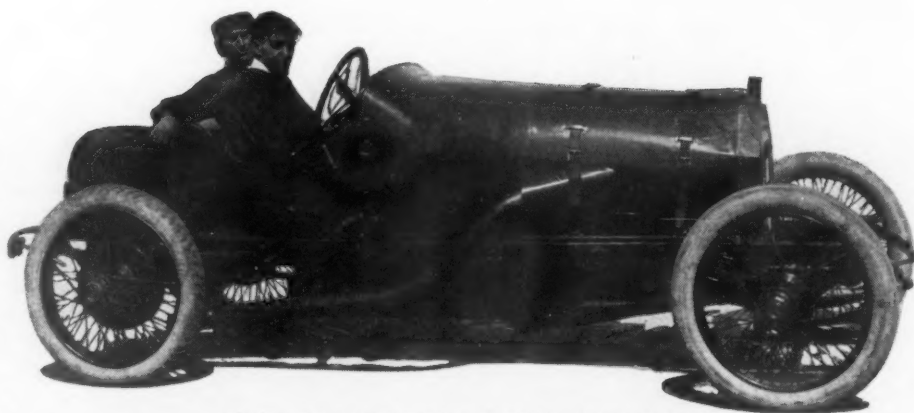
victory of a Stutz. That Gill Anderson in a Stutz was not in at a fighting finish was due to a broken camshaft after he had run a gruelling race and it looked as if the Peugeot might have to look to its laurels. It was no walkover for Goux by any means.

Finishing behind the French creation were Wishart in No. 22 Mercedes, Merz in No. 2 Stutz, Guyot in the English Sunbeam, Pilette in the German Mercedes-Knight, Wilcox in the Fox Special, Mulford in the Schroeder Mercedes, Disbrow in the Case, Haupt in the Mason and Clarke in the Tulsa. Bob Burman was flagged off.

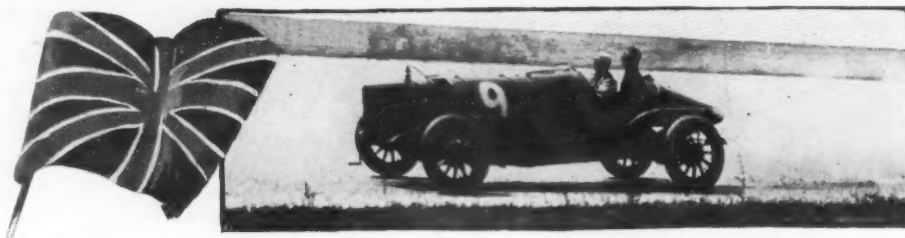
#### Sensational Incidents

The race fairly bristled in sensational features and there only was one accident to mar the affair—when Jack Tower in No. 6 Mason turned over on the south curve, injuring both himself and his mechanic. Then there was the case of Bob Burman, leader of the pack in the early stages of the race, who was put out temporarily when his carbureter caught fire. Returning after he was put out of the running and after he had changed carbureters, Burman put new ginger into the race by sensational bursts of speed that more than once coaxed Goux out of his phlegmatic plug. Burman showed his car had plenty of speed and it would be hard to predict what would have happened if he had not been side-tracked for a while.

Then there is the case of Mulford in the German Mercedes, who ran out of gasoline when in the backstretch, costing him a valuable half hour which probably made a difference of \$8,200 in his winnings, illustrating the high cost of fuel—a case of throwing away an \$8,000 farm for the price of 1 gallon of gasoline—20 cents. Mulford's tank ran dry at a most inopportune time and under the rules he had to send his mechanic to the pits for a fresh supply. The poor chap had to run a mile, but the effort kept Mulford in the prize money and made it possible for him to finish. It was another case of Hughie Hughes, but Hughes was fortunate in that



WISHART IN MERCER SECOND, IN BIG RACE



GUYOT'S SUNBEAM, ENGLISH CAR THAT FINISHED FOURTH

last year he was able to push his car to the pits. From being a possible second and even a possible winner, Mulford was fortunate in being able to land in seventh place.

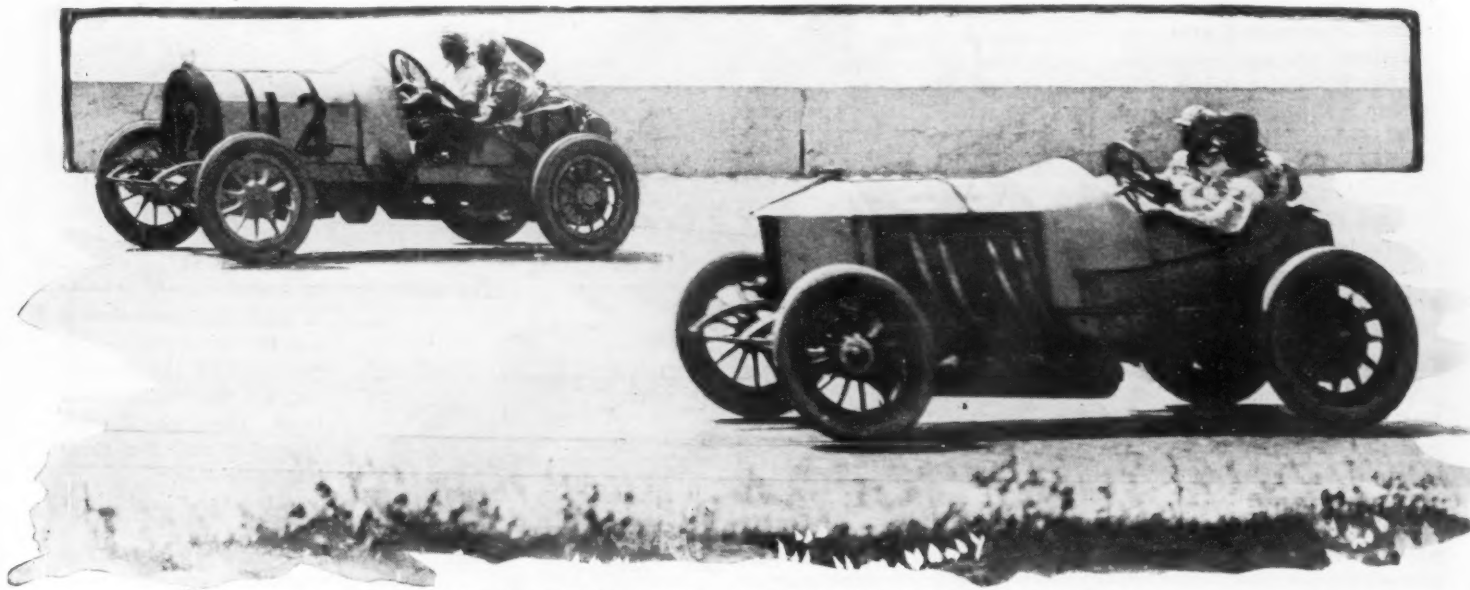
#### Merz Makes Fiery Finish

Lastly, in the way of sensations, the vast crowd of spectators had the case of Charley Merz in No. 2 Stutz, a demonstration of pluck that is seldom seen on a race track. Starting his last lap, Merz's Stutz was a flaming torch of gasoline under the bonnet. If he stopped at the pits to extinguish it he lost his chance of beating out the Mercer for second place, so he pluckily continued for the lap which ended with the checkered flag. Coming down the stretch for the last time, the Stutz, a mass of flames in front, coasted over the line and to the pits, with the mechanic sprawled over the bonnet fighting the fire. And

Merz lost second place by just 36 seconds.

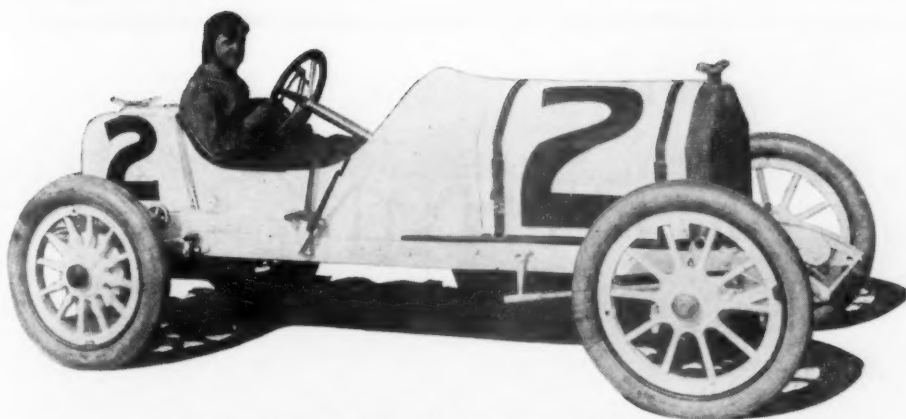
On this last lap he took chances of the flames destroying the ignition wiring and stopping him in the backstretch—a stop that would have cost him just \$5,000. But surely Harry Stutz had a little luck coming to him after the turn of Fortune's wheel that stopped poor Gil Anderson.

There were other but minor sensations—nothing spectacular, it is true, but interesting nevertheless. For instance, Mulford broke a record by going the entire 500 miles without a change of his Braender tires. The Sunbeam went through with but three changes of its Dunlops. And while we are on the matter of tires, it is worthy of note that the French invader had to rely on the American rubber merchant for his casings—he used Firestones and so did Wishart in the Mercer on the rear wheels of his car.

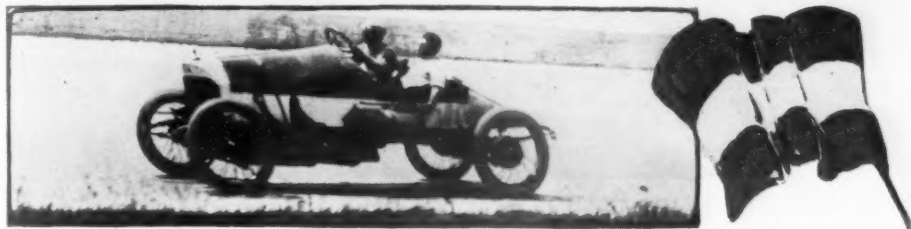


WILCOX IN FOX SPECIAL, SIXTH, AND MULFORD, MERCEDES, SEVENTH





MERZ IN STUTZ, WHO RAN THIRD IN SWEEPSTAKES



PILETTE IN MERCEDES-KNIGHT, FIFTH AT INDIANAPOLIS

Then, too, there is the case of the little Mercedes-Knight driven by Pilette, who made an average of 20 miles to the gallon in the way of gasoline consumption. Also be it remembered, this is the first time a Knight-motored car ever has competed in an American race, Pilette going through the 5 centuries with but one stop for mechanical reasons, and that only for a carburetor adjustment.

#### Twenty-Seven Cars Start

Twenty-seven of the thirty-one entries went to the tape. Of this number the Smada was withdrawn before the eliminating trials; the Shambaugh was pulled out because of the disqualification of its entrant by the A. A. A. for competing in an unsanctioned meet; the Deltal, which Joe Dawson was to have driven, was scratched because of a mishap mechanically before it went up for its tryout, while the

Pennebaker car was not completed in time for the crucial test.

Comparisons with the two previous races prove interesting, especially in the matter of drivers. Ten of the twenty-seven who competed yesterday have started in all three sweepstakes, but of these ten only two have cashed in all three. Merz in a National was seventh in 1911, fourth in a Stutz in 1912 and third in a Stutz in 1913. Mulford, driving a Lozier in 1911, was second; in a Knox he was tenth last year, while this time he ran seventh in a Mercedes.

The three Isottas were greatly handicapped and did not show their true form because they did not reach the speedway in time. Their construction delayed because of a strike at the factory, the Italian creations only got to Indianapolis last Tuesday. The motors never had been run

off the block, the cars were not tuned up and the only chance they were given for speed was in the eliminating trials, after which Trucco, Tetzlaff and Grant got busy trying to whip them into shape. They went into the race loosened to the last notch in the hopes that maybe they would get through—they didn't, that's all.

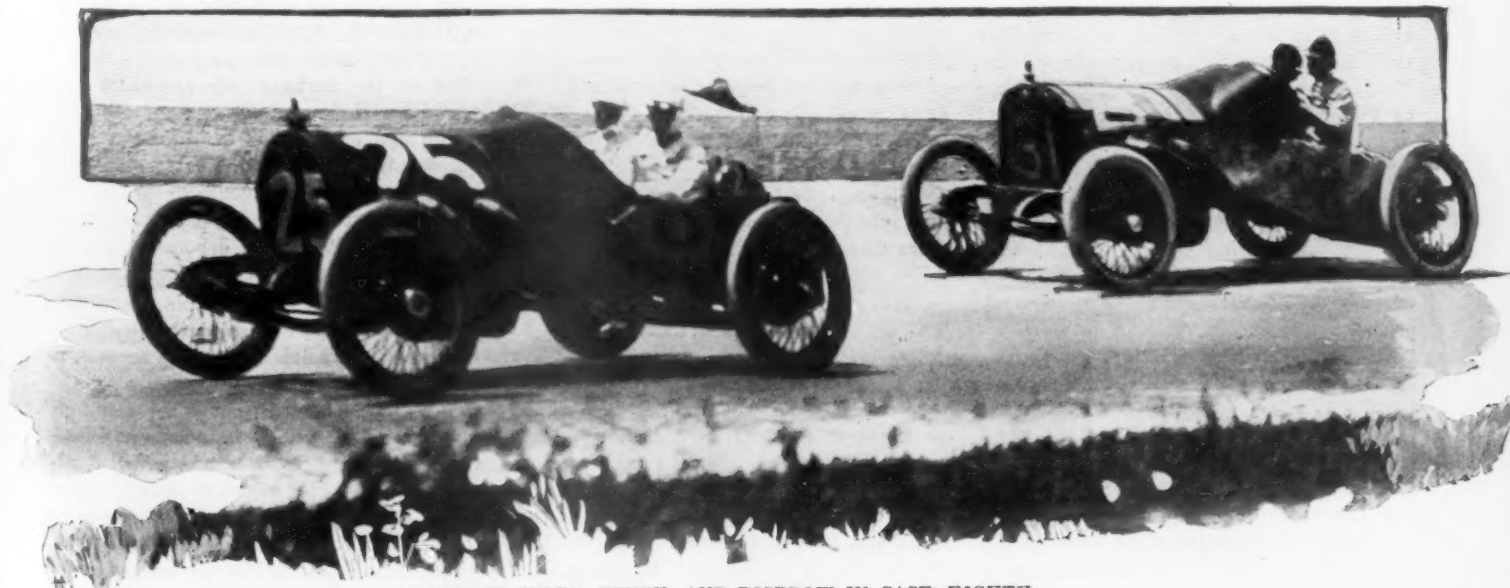
While no official figures have been given out as to the attendance, it is stated on good authority that the count showed 96,000, inclusive of passes and everything, and there were very few passes. This is 18,000 more than last year. As to how much this netted in a financial way it is hard to say, but the receipts must have been in the neighborhood of \$250,000, which would leave a nice balance after the cost of promotion—\$80,000—has been deducted.

#### Comparing the Cars

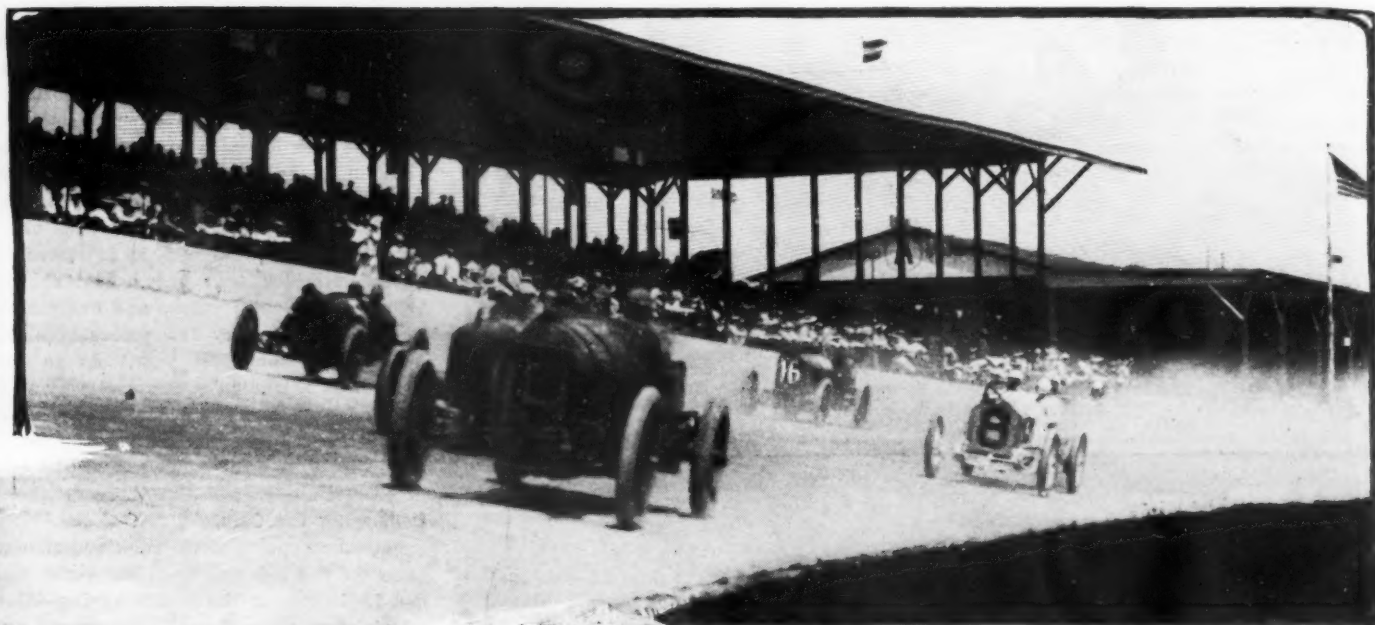
Some conception of the relative performances of the ten cars completing the race can be had from the accompanying table, which gives their piston displacement and the speed in miles per hour that they averaged. Their weights are also given. The Peugeot was right up to limit, so was the Case and Mulford's Mercedes 10 cubic inches under the limit. These were the only cars to exceed the 400-cubic inch mark, the limit set by the rules being 450 cubic inches. No. 22 Mercer and No. 23 Mercedes-Knight were the smallest capacity motors in the race, the Mercer 299 and the Mercedes-Knight 251. It would be possible to use a 400-cubic inch limit next year and have practically as fast a race as this season. With the reduced piston displacement there is a proportional increase of motor speed to get the power.

No.	Car	Piston Displacement	Speed	Weight
16	Peugeot	448	75.92	2200*
22	Mercer	299.7	73.49	2450*
2	Stutz	399.97	73.38	2350
9	Sunbeam	380.8	70.92	2300*
23	Mercedes-Knight	251.33	68.14	2380*
12	Gray Fox	389	67.65	2640*
29	Mercedes	440.8	66.95	2850
31	Case	449	63.08	2140*
35	Mason	350.5	63.47	2000
25	Tulsa	340.1	62.99	2150

\*Tanks empty



CLARK IN TULSA, TENTH, AND DISBROW IN CASE, EIGHTH



BRAGG IN MERCER, LEADS FIELD IN GETAWAY

## Champagne, Castor Oil and Gasoline

### The Liquid Ingredients in M. Jules Goux' Victory

By J. C. Burton

*"Sans le bon vin, je ne serais pas été en état de faire la victoire."*

SIX pints of sparkling wine won for Jules Goux, of Paris, the third annual international sweepstakes at the Indianapolis motor speedway last Friday. Six pints of bubbling, invigorating champagne cost America the coveted laurels with which Ray Harroun and Joe Dawson were crowned in 1911 and 1912, respectively. Six pints of non-Bryanized grape juice restored to France the speed supremacy of the new world, a supremacy made possible by the triumphant feats of George Heath, Victor Hemery and Louis Wagner in the early days of Vanderbilt cup competition.

#### Worshipping the Great Joss, Speed

Six and a half hours after the bomb which sent a roaring monsoon of muscle and steel away to sweep time and space before it in a 500-mile rampage exploded, the grease-spattered hood of the blue Peugeot was flicked by the checkered flag of victory and two kisses were imprinted on the dirty cheek of Monsieur Goux. One hundred thousand worshippers in the temple of the great joss Speed paid vociferous homage to a conquering Parisian. The tricolor which waved in triumph over Lodi, Marengo and Austerlitz more than a century ago, floated proudly over the circus maximus of America. A modern Napoleon, ambitious, determined, daring and resourceful, was the hero of two continents.

As he vaulted from his silent car to receive the congratulations of foemen who made sincere hands speak for untutored lips and the osculatory demonstrations of his joyful and gesticulating helpers, the gallant Gaul seemed anything but fatigued, although his swarthy face was drawn and

dirty, his twinkling eyes sunken and blood-shot, and his smiling lips cracked and parched. When the last hand had been clasped and the last kiss tendered, Goux grasped a bottle of champagne with the calloused numbed fingers that had guided the plunging Peugeot 200 times around the brick oval and drained the contents at one gulp. It was the seventh pint he had consumed in as many hours.

"But for the wine, I would have been unable to drive this race," he murmured as he smacked his lips.

In the immaculate evening dress of the boulevardier, Jules Goux had sipped the wine from the vineyards of France in the cafes and cabarets of Paris and called it "le bon vin." In the grimy suit of the racing driver, Jules Goux gulped champagne at his pit and termed it a nectar, a nerve-sustaining potion that quickened the mind and eye, conquered fatigue and spurred on supreme desire.

#### Goux Takes Refreshments

"Wine is a mocker" King Solomon wrote 3,000 years ago. "Wine is good," Jules Goux cried at the conclusion of Friday's 500-mile race. Here is an argument between two eminent authorities, each in "all his glory." Which theory are we to accept? Perhaps both are right. Wine probably would have been a mocker had the American drivers drank it. No doubt its indulgence would have deadened their senses and tempted them to take chances which might have been fatal. But to the high-strung temperamental Goux, it was drink and food and a spur. Rich trophies and \$20,000 in prize money he won and to the wine he drank, the victor gives credit.

Six bottles of champagne Goux gulped down while engaged in that Homeric struggle. Once a pitman dashed a cupful of the bubbling wine in Goux's face as the Peugeot driver threw in his clutch and resumed his perilous flight after stopping at the pits for a tire. He grinned and wagged his head when thus baptised and rolled away with exhausts popping and motor barking defiance to challengers from America, Italy, England and Germany.

#### Castor Oil a Factor

But wine was only one of three liquid ingredients in that sensational victory. There were gallons upon gallons of gasoline, gasoline of high test, blood for the steel-hearted, aluminium-veined monster that thundered to the front at the conclusion of the fortieth lap and held that proud position until the end of the race. There was quart after quart of castor oil which, after mixing with the gasoline, sent up a nauseating, pungent incense to the gods of speed who favored the blue Peugeot and its daring driver in the race for international supremacy.

Champagne, castor oil and gasoline—this was the liquid combination that made the French invasion of America successful. But Goux praised only the juice of the grape. He lauded not the lethargic dinosaur of Mesozoic existence who, when transmogrified, became a fluid which rivals the swiftness of birds and aids in emulating their flight. He paid no tribute to the seeds of the *Ricinus communis* which when boiled and refined produce the oil that is more often found in the family



medicine chest than in the tank of the motor car.

Goux's statement as he gulped his seventh bottle of champagne is a testimonial for the wine agents to adopt, if nothing else. It also causes some idle speculation as to how the map of Europe would look to-day had the soldiers of the legion been served a few pints of the effervescing beverage on the red morning of June 15, 1815.

*Vive le bon vin! Vive le roi de vitesse!*

At 10 o'clock in the morning America is expectant and confident. A scorching May sun, which looks like a colossal blotch of yellow ink on an expansive sheet of blue blotting paper, halos a scene which eclipses in grandeur the masterly stage setting of a Belasco. One hundred thousand worshippers are gathered in the temple of the speed gods—one hundred thousand fanatics who rise to their feet at the raucous chant of the announcers, one hundred thousand spectators who will acquire thrills, a coat of tan and an appetite as the red day wears on and the torrid sun mounts higher in the sky.

#### Five Nations Represented

In rows of four are twenty-six high-powered racing machines, the speed creations of the master engineering minds of America, France, England, Italy and Germany, a fleet flotilla of red, green, blue, yellow, grey, white and tan dreadnoughts. At the wheels sit the greatest of racing drivers, mad Mullahs who defy the fates and court death to win fame and fortune, flying Mercuries of stout hearts and taut nerves. The track is dry and red. Soon it will be slippery with oil where tires will slip and burn and the muscles of man be strained to conquer the skidding masses of steel.

There is a cheer. Eyes are directed to the roadway from the infield near the first turn. A green car rolls out on the track. It is the Keeton. Burman, who has worked all night replacing a broken steering knuckle, has entered the lists at the fifty-ninth second, a speed specter in white to defend America against the avaricious invaders—to start, to stop, to faint in his futile defense; then to recover and resume the chase.

A bomb explodes. There is a rattle of shifting gears, a deafening roar of impatient motors, a mighty cheer from many thousands. In a cloud of smoke the cars start away sounding a note of determination that will change to desperation before the last lap is turned. The struggle for the world's speed supremacy is on. The split-second hand of a stop watch becomes the moving pen that is to write a new chapter of motor history.

Lap after lap is reeled off by the steel monsters as the watch hand turns monotonously. Like the blue bottles in the bar room song, car after car suddenly disappears. Some never pass the cheering stands again. They lie on the rim of the huge brick saucer, twisted, broken and foreboding. Others pass in shameful re-

view, pushed by man instead of being driven by gasoline, to be docked at pit and garage, abandoned and cursed by drivers because of faithless rods, fickle bolts and faulty engines.

#### Fine Work by Cooper

Comes 4 o'clock. The odor of burning rubber pollutes the fresh spring air. Of the seven and twenty cars that rumbled and roared a strident challenge 6 hours before, only eleven are on the track, ten barking desperately after an arrogant blue leader which sounds a braggard's note.

America now is skeptical but hopeful. The Peugeot's roar sounds more menacing, more invincible on each lap, but Cooper, in the sturdy Stutz, is driving like a madman to save America's plumed prestige and Cooper will succeed if daring and desire are the ingredients of victory. For Cooper is running like Hell—this is no profanity—he is running like Hell. But Cooper has slacked his thirst with lithia water. Champagne has wet the parched lips of Goux and awakened dormant ambition in his very heart, his very soul.

The Peugeot, the Napoleonic blue Peugeot, leads by 4½ minutes. There are but 20 miles more to run in the grueling grind and the race will be over. Gil Anderson, the blood again flowing through the veins of his numbed hands, takes the wheel of the Stutz to drive his heart out, to drive his car to pieces in hopeless pursuit of the conquering Gaul.

Another half hour and the race is won. Goux is champion of the speedway. Anderson, tears streaming down his greasy cheeks, sees his foeman flash across the wire from the pits. The once-sturdy Stutz has been eliminated. Its challenging roar is silent. It stands, crippled and wasted, near the victors of 1911 and 1912, Harroun's Marmon and Dawson's National.

America is downcast but cheering, for America is a good loser. One hundred thousand of its sons and daughters rise to

their feet and pay homage to a slender hero in llama jacket, checkered knickerbockers and brown doeskin puttees. Shutters of a score of cameras snap as he waves an American flag and gulps down a bottle of wine to celebrate his victory. France is once more supreme in the new world and Bacchus joins the gods of speed in their exultant revels.

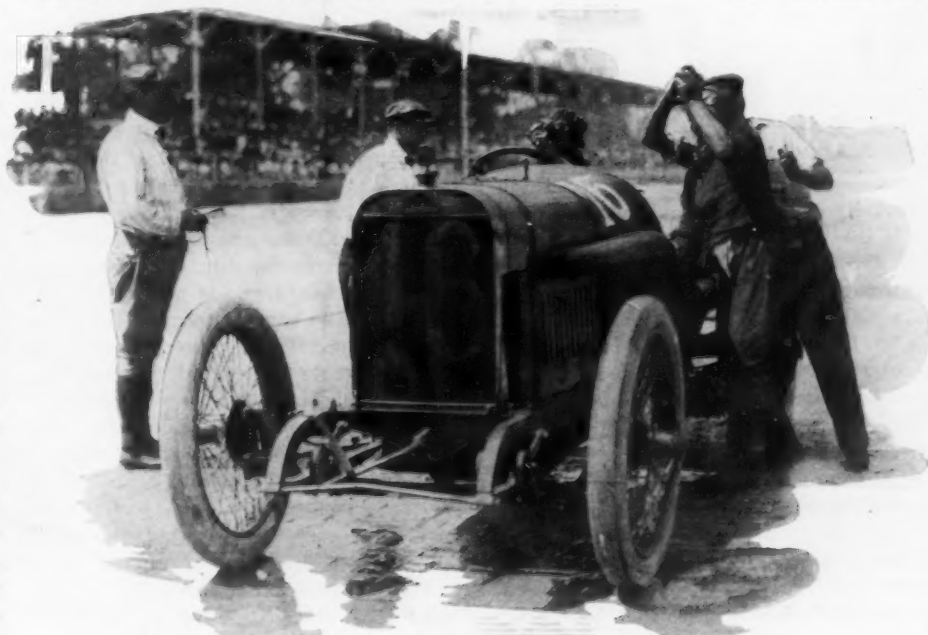
The victory of Goux and the Peugeot was a surprise as well as a disappointment to American race critics who, admitting the French car to be fast and its driver efficient, prophesied that the blue machine would not be able to sustain the grind of 500 miles and that its pilot would be handicapped by the shortness of time in which he had to learn the peculiarities of the speedway.

#### Keeton a Contender

Condemned by the Peugeot team manager and consulting engineer of the Peugeot factory, M. Charles Faroux, as poorly balanced for the Indianapolis track, the French entrant was not considered as dangerous a contender as the English Sunbeam, which finished in fourth place. When Zuccarelli retired the No. 15 Peugeot on the twenty-first lap, after a gas line gave way and the carburetor caught fire, it looked as if the ominous prediction made before the start would be fulfilled and that Goux would be forced to dock his mount before the race was over.

The fact that both Goux and Zuccarelli regarded the Keeton as the most formidable car in the race and that Goux took up the challenge of Burman early in the contest when Burman was leading the field, also satisfied the critics that they were justified in their prophecy that the holder of the 1-hour record would pound his car to pieces in his desire to keep on even terms with the pace-maker.

Even at the end of 350 miles, when Goux had a lead of two and one-half laps and had annexed the Remy brassard and



Photograph by Underwood & Underwood, New York  
GOUX STOPS FOR CHAMPAGNE AT THE PITS





VIEW OF PADDOCK SHOWING PARKING SPACES AND THE PITS

Prest-O-Lite trophies by averaging 77.18 miles an hour in his flight over the slippery bricks, it was the common belief around the pits that the Peugeot was destined to meet the same fate that de Palma's Mercedes did a year before.

"It'll drop out soon after running 400 miles," was the confident prediction of the men in the Stutz pit, who were watching the Sunbeam and Mercedes-Knight with more concern at that stage of the race than the plunging Peugeot.

But predictions are like \$5 bills and New Year's resolutions. They are broken more often than they are kept. Goux did not follow Zuccarelli to the grey garage, pushing a disabled car before him. The slender Frenchman did not burn up his tires in going into the turns or pound his machine to pieces in shaking off the determined challenge of Anderson, Mulford and Merz. He won the Wheeler & Schebler cup when he crossed the wire for the one hundred and sixtieth time and maintained his early pace of 77 miles an hour with few variations until the end.

#### Goux Shows Great Skill

Goux proved himself a master at the wheel from the time the bomb was fired until the checkered flag was waved. He was daring but not too daring. He took the turns like a Harroun or Dawson, drivers that know every one of the 3,500,000 bricks in the speedway. He curbed his natural impetuosity to open up when high speed was unnecessary.

There was a master mind in the Peugeot pit, as there was a master mind at the Peugeot wheel. It was Johnny Aitken, former National racing manager, who acted as a governing valve on Goux's Gallic impetuosity. Moreover, Goux obeyed Aitken's signals. When "Retardez" showed in letters of white on the black board, the Frenchman restrained his desires and slowed down. At the signal "Allons"—

it was rarely given—he smiled as he stepped on the throttle and urged the willful Peugeot on to pass its competitors.

Considering the unfriendly intensity of the sun, the little practice he has had and the tire troubles he encountered in warming up his car, Goux made but few stops for shoes. He signalled for new rubber but nine times, a phenomenal record compared to his showing in practice when he averaged but four laps to a tire.

#### Gil Anderson Prominent

Although the early pace set by Burman when he averaged 79 miles an hour for 100 miles seemed to trouble the impetuous Goux, the Frenchman only had one serious contender, Gil Anderson, after the Keeton caught fire on the fifty-fifth lap. The driver of the No. 3 Stutz, although trailing two and one-half laps, looked exceptionally dangerous and was in a position to forge to the front should predictions hold and the Peugeot be forced to stop for repairs. Near the close of the race, Anderson, his hands bleeding and his strength almost exhausted, was relieved by Earl Cooper. As when Patschke took the wheel of the Marmion in 1911 and Herr went to the driver's seat of Dawson's National last year, Cooper shoved the gas lever up several notches and sent the consistent white car after the blue invader. It was a spectacular chase. The Stutz responded as if human. Cooper gained on every lap. With 50 miles yet to run, the Stutz was but 4½ minutes behind the Peugeot and a stop for a tire by Goux would give Anderson, who again took the wheel of the plucky Stutz, the lead, perhaps victory.

But the Peugeot did not stop. It was Agan, Anderson's mechanic, not Begin, who rode with Goux, that held up his right hand as the Stutz thundered by in its desperate chase after the foreign machine. The next time around the Stutz stopped. So did its engine. A rear tire change was

made in less than a minute. Hope was not dead yet, but the motor was, and after five sweating, swearing pitmen had turned the crank lever in vain for fully 3 minutes, the white car was pushed into the oblivion of the infield with a broken camshaft gear. As it rumbled with shame over the grass, its wheels crushed the last chance of an American victory.

Much of the credit for the showing of the Mercer, which finished in second place nearly 14 minutes behind the conquering Peugeot, must be given to Ralph de Palma, child of misfortune, from whose hands the fates snatched victory in last year's race. The same fates rode with him on Friday in the No. 21 Mercer and again made the hood a Pandora's box when a cylinder cracked early in the speed struggle. De Palma wheeled the yellow car to the sheds and returned to the pits to relieve Bragg and Wishart, his teammates. With the race half over and Bragg's car trailing too far to be a contender, the Italian took the wheel of Wishart's machine and brought the Mercer from ninth to third place before turning it over to Wishart for the final laps of the struggle.

#### Race Develops Heroes

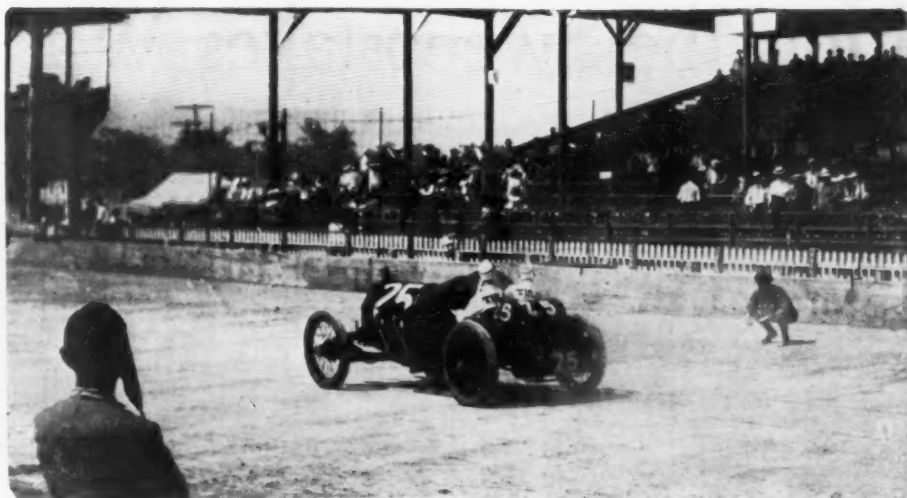
The 500-mile race is a mold in which heroes are cast. Pigymen enter it and emerge Titans. It is a contest that breaks hearts, shatters nerves and puts fortitude to the acid test. It always has been, it always will be and the 1913 classic is no exception.

Charles Merz, driver of No. 2 Stutz, disobeyed orders. Because he did, his hands are burned, but the car he drove finished third and he won \$5,000 by his daring. He was in fourth place at the end of the one hundred and eightieth lap and when Anderson was forced to retire, moved up automatically to third position. For over 100 miles he had been running desperately, refusing to give a second.

Gradually gaining inches when miles were needed to make him victor, Merz was given the green flag after the Mercer started on its last lap. As he crossed the wire the front of his car was aflame. Stutz pitmen waved him in. Between \$5,000 and Merz, they chose the man. Merz saw the frantic signals but did not heed them. In a veritable chariot of fire he drove the final 2½ miles, his mechanic, Martin, lying across the hood and beating at the flames with his bare hands. There is something to admire in men like Merz and Martin, men who never quit.

There were few spectators in the cheering stands who knew who Stevens was at the start of Friday's race. He was an unknown, this big-hearted, never-quit boy who rode beside Ralph Mulford, vice Billy Chandler, smiling Ralph's former mechanic who this spring was promoted to relief driver on the Mercer team. It was Stevens' first 500-mile race, but he was equal to the ordeal, more than equal, as he proved near the close of the struggle.

Laying back at the start, Mulford gradually bettered his position as he reeled off lap after lap and at the end of 250 miles he was in third place. He had not made a stop at his pits and his motor was sounding a menacing challenge. Mulford took on fuel after running 275 miles, breaking all records for nonstop competition, and then was the victim of the "unexpected something" that always happens in a motor car race. With third place practically clinched, Mulford ran out of gasoline on the back stretch. Leaping from the exhausted Mercedes, Stevens started for the pits, more than a mile away. Seconds are precious in a struggle where \$50,000 is at stake. Stevens may have been a tyro, but he knew that. Darting through the crowds of the infield, stumbling and falling in the high grass, jumping fences and creeks of sluggish water, the modern Pheidippides raced to the pits, staggered over the pit rail so as not to be disqualified, cried "Ralph's out of gas" and fell in a faint, while another mechanic ran back to Mulford.



CLARK IN TULSA IN THE BRAKE TEST

## De Palma Proves His Sportsmanship

ON the glorious afternoon of August 31, 1912, when Ralph de Palma won the Elgin National trophy and the free-for-all in a car over which he had but partial control—the clutch plate of the Mercedes was cracked—E. C. Patterson, entrant of the Mercedes-Knight in Friday's race, paid tribute to the triumphant Italian in this eulogy:

*"DePalma is a popular winner because he is a good loser."*

No doubt Patterson was thinking of the tragedy of last Memorial day and heard again the roar of the blue National as it thundered by the stands and the despairing cry of the crowd, "Where is de Palma?" No doubt he saw the gray blur on the homestretch, saw de Palma pushing his crippled car in, a vanquished challenger in a race that 10 minutes before was conceded to be his without question. With face dripping with perspiration, de Palma rolls his car over the wire, raises his head and smiles at the cheering throng. De Palma is a man. He does not cry or curse his luck when beaten. De Palma is a

sportsman. He is the first to grasp the hand of Dawson for Fortune, which frowned upon Ralph, had smiled upon Joe.

*"Boys, don't forget that Caley Bragg wasn't to blame. He gave me all the road."*

That was what de Palma said to the newspaper reporters when he was lifted from the ambulance at the doors of a Milwaukee hospital after being thrown from his car and seriously injured in his attempt to overtake Bragg on the last lap of the 1912 grand prize race. It was a question then whether or not Ralph would survive that crash. He was bleeding from many wounds and internally injured. In such a perilous condition, his first thought was to exonerate a competitor.

*"It's the luck of the game."*

Disappointed, heart-broken, de Palma gave this as the reason for his withdrawal on the seventeenth lap of Friday's race. He smiled a friendly, good-natured smile as he rolled the disabled Mercer to the garage. It was the same smile that was on his grimy face the year before when he pushed the exhausted Mercedes over the line to see Joe Dawson get the checkered flag. It was a sportsman's smile, the smile of a good loser.

*"If you run out of tires, Frank, you can have what you want from my pit."*

That was answer of de Palma to a rival's call for aid last Friday afternoon. At the time Bragg's Mercer was trailing the Gray-Fox and Wishart's Mercer was leading Howdy Wilcox by a few minutes only. Fox was short of tires. He was using the same size front shoes as those stacked in the Mercer pit. He had asked de Palma to lend him some in an emergency and de Palma replied like a man, although such a loan might have caused the Mercer the loss of second place and \$10,000 in prize money.

It is great to win, to hear cheering thousands hail you as a victor; but to play fair, to be a sportsman in triumph and defeat—that is greater yet.



REMINECENT OF OTHER RACES—WINNING MARMON OF 1911 AND VICTORIOUS NATIONAL OF 1912



# How the Sweepstakes Was Run and Won

## American Cars Push Foreigners Throughout the Race

### POSITION OF CARS EVERY EIGHT LAPS OF THE 500-MILE RACE

No.	Car and Driver.	Miles—	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
16	Peugeot, Goux		1	13	9	5	2	2	1	1	1	1	1	3	1	1	1	2	1	1	1	1	1	1	1	1	1
22	Mercer, Wishart		16	16	15	10	9	8	8	6	5	5	5	4	6	5	4	4	4	4	3	4	3	3	3	3	2
2	Stutz, Merz		14	19	11	8	7	6	5	4	4	4	4	4	4	4	5	5	5	5	5	5	5	4	4	2	3
9	Sunbeam, Guyot		17	8	4	3	5	4	4	4	4	4	6	6	7	6	7	6	6	6	6	6	6	5	5	4	4
23	Mercedes-Knight Pilette		18	17	17	12	11	11	12	11	10	9	9	8	8	8	7	7	7	7	7	7	7	6	6	5	5
12	Fox, Wilcox		10	4	14	15	13	13	11	10	8	8	8	9	10	10	9	9	10	10	9	8	8	8	7	6	6
29	Mercedes, Mulford		15	6	3	2	4	3	2	3	3	3	3	2	2	3	3	3	3	3	2	3	4	7	9	7	7
31	Case, Disbrow		21	15	8	7	18	10	9	8	9	14	13	13	12	12	11	11	11	11	9	9	9	8	8	8	8
35	Mason, Haupt		2	9	13	16	18	18	17	16	16	16	15	14	14	14	13	13	13	12	11	11	11	11	11	10	9
25	Tulsa, Clark		22	18	18	17	15	16	13	15	13	13	12	12	13	13	12	12	12	12	11	10	10	10	10	9	10
4	Keeton, Burman		6	1	1	1	1	1	16	18	15	15	17	17	17	16	14	14	14	14	13	12	12	12	12	12	2
3	Stutz, Anderson		12	7	5	4	3	5	3	2	2	2	2	1	3	2	2	1	2	2	5	2	2	2	2	2	2
5	Mason, Evans		19	5	12	18	17	15	14	14	12	10	11	11	11	11	8	8	8	8	8	8	8	8	8	8	8
17	Anel, Liesaw		13	14	10	14	12	12	10	13	11	11	10	10	9	9	10	10	9	9	9	9	9	9	9	9	9
19	Mercer, Bragg		9	11	7	20	19	19	18	17	17	17	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15
10	Henderson, Knipper		11	10	16	11	14	14	15	12	14	12	14	16	16	17	16	16	16	16	16	16	16	16	16	16	16
27	Isotta, Tetzlaff		20	12	6	6	6	7	6	9	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6
32	Case, Nikrent		7	3	2	9	10	9	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
6	Mason, Tower		5	21	20	19	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
28	Isotta Trucco		25	20	19	13	Out	97.5 miles																			
1	Nyberg, Endicott		24	22	Out	57.5 miles																					
15	Peugeot, Zuccarelli		8	2	Out	45 miles																					
21	Mercer, DePalma		3	Out	37.5 miles																						
26	Isotta, Grant		4	Out	35 miles																						
18	Schacht, Jenkins		23	Out	32.5 miles																						
8	Stutz, Herr		8	Out	17.5 miles																						
33	Case, W. Endicott		33	Out	2.5 miles																						

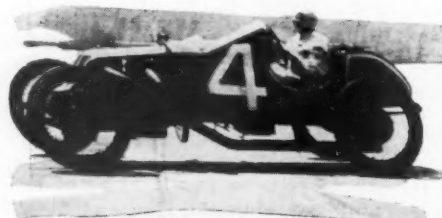
\*Running when race was called  
†Out 469 miles

### By David Beecroft

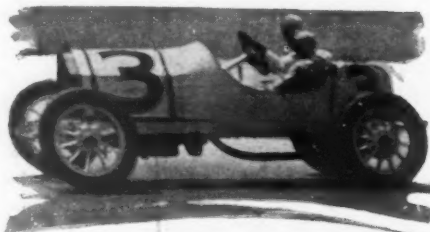
THE race, although slower, was a more enjoyable and fascinating one than that of a year ago, the slower pace not being recognized by the contestants because of the changing positions of the leaders until after the 400-mile mark was reached, after which the Peugeot never was headed off and started opening a gap of 3 minutes between it and Anderson's Stutz, which disputed every mile of the race until eliminated by a broken camshaft at 460 miles when running in second place. From 3 minutes the gap grew to 4 at 440 miles, then to 6 at 460 miles, then to 12 at 480 miles, and finally ended in a lead of 13 when the checkered flag was flaunted before him.

### Race One of Thrills

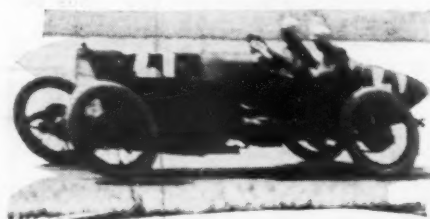
The race was one of thrills, yet remarkably free from accidents, only one marring the sport, that being the overturning of Jack Tower's Mason at 125 miles, Tower suffering a broken leg and his mechanic some fractured ribs. Scarcely had the starter's flag been laid aside when the crowd was stirred by the struggle of the American drivers with the pick of France, Goux and Zuccarelli in their Peugeots.



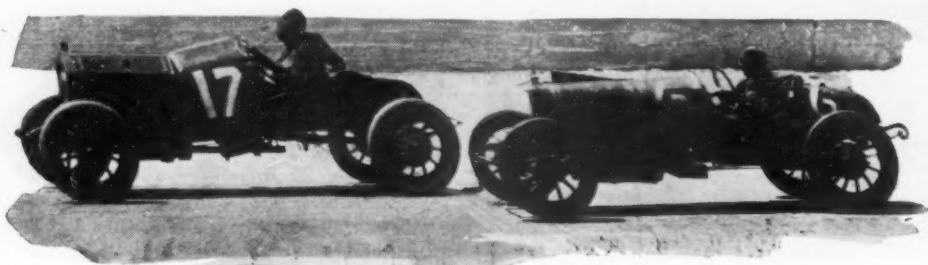
BURMAN IN KEETON



ANDERSON IN STUTZ



TETZLAFF IN ISOTTA



LIESAW IN ANEL AND TOWER IN MASON

Bragg, who had the inside position in the front line of starters, took the advantage and led the field for the first lap; Evans put No. 5 Mason into the lead for the second lap. He held it in the third, but Goux came to the front on the fourth, held it by 200 yards in the fifth, increased it to 400 in the sixth, added a little more in the seventh and gained some more in the eighth. With eight laps, 20 miles, covered it looked as if the much touted Goux was going to make a runaway of the day. But the hopes of his admirers were short lived, for Burman, who was late reaching the starting line, was after him. He was getting his Keeton under way, and at 40 miles he was hitting well over 100 miles per hour on the straightaway and coasting the turns. It looked as if his chances were good. At 60 miles he had 3 minutes' lead on the Frenchman, with three other cars between him and Goux. At 80 miles he still led with over 3 minutes' leeway; at 100 miles he retained a good margin; at 120 miles he still led; but fortune failed him; his carburetor caught fire, he lost nearly an hour, and Goux took the lead at 140 miles, with Anderson's Stutz, Mulford's Mercedes and Guyot's Sunbeam all bunched 3 minutes behind him. Once more it seemed Goux's chance to pull away if his tires would only hold up. They did and he led for another 100 miles until pushed out of position at 240 miles by the Anderson Stutz and Mulford in the Mercedes.

### Frenchman Regains Lead

At 260 miles the Frenchman got the premier position back with a margin of less than a minute. Mulford and Anderson hung on with the desperation of demons. At 300 miles Goux had opened a



gap of scarcely 2 minutes on Anderson, but at 320 Anderson was back in front with 23 seconds on the Peugeot.

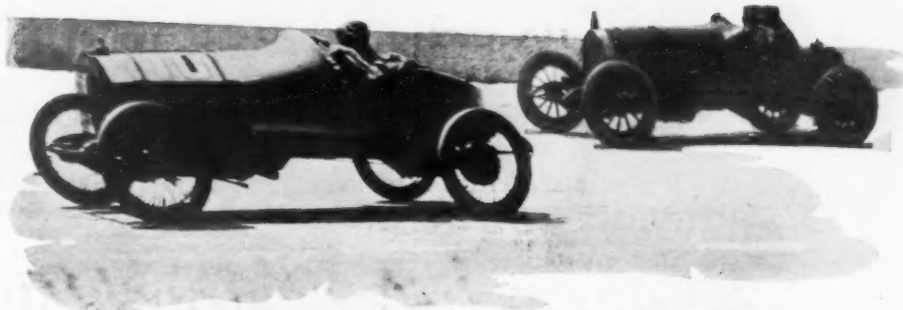
But fortunes change and positions went up and down. Goux took the lead at 340 miles and held it to the end. For 120 miles Anderson's Stutz hung onto him with determination that warmed the heart and fired the enthusiasm of every American who watched the gladiators, and until a broken part when but 30 miles from the finish robbed him of a well-earned second place.

Anderson and Goux were battling in a class by themselves 8 to 10 minutes ahead of the remainder of the field. It was a noble fight, with odds favoring the special Peugeot, the French grand prix winner a year ago. When Anderson coasted into the pits, lifted the hood of his motor, gave a few turns of the starting crank and then pushed his white racing machine into the paddock a pall of gloom fell over the countless thousands. America's best fighter had given way to a foreign foe and the public looked to new leaders for America. Hopes were placed on Wishart's Mercer and Merz's Stutz, running scarcely a minute apart. But they were 12 minutes behind the flying Goux and with scarcely 20 miles to go there was little hope of victory. Goux counted on tire trouble, but with expert pit aid he scarcely lost a minute to a change, he saw the race was won, he slackened his pace and won easily.

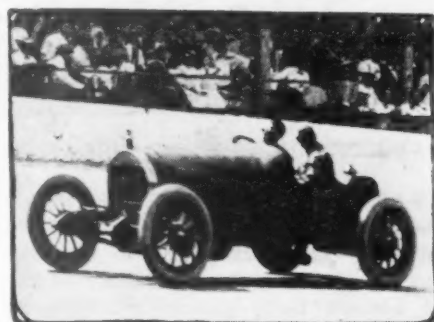
#### The Wishart-Merz Duel

With first position settled, the fierce duel between Wishart and Merz for second position and a \$10,000 purse was taken up by the grandstands and bleachers. Although not in the limelight, these two had been waging equal warfare from the very start of the grind. They generally were 4 or 5 minutes back of the leaders until the 400-mile mark, when they were 13 or 14 minutes back of the Frenchman.

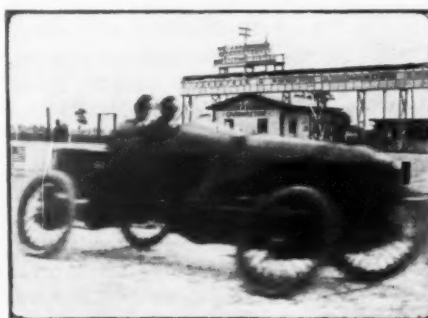
From the drop of the flag to the finish it was a neck-and-neck battle between Wishart and Merz, with but 36 seconds separating them at the finish. First one had the advantage, then the other, with not a



KNIPPER IN HENDERSON AND BRAGG IN MERCER



DE PALMA IN MERCER



H. ENDICOTT IN NYBERG

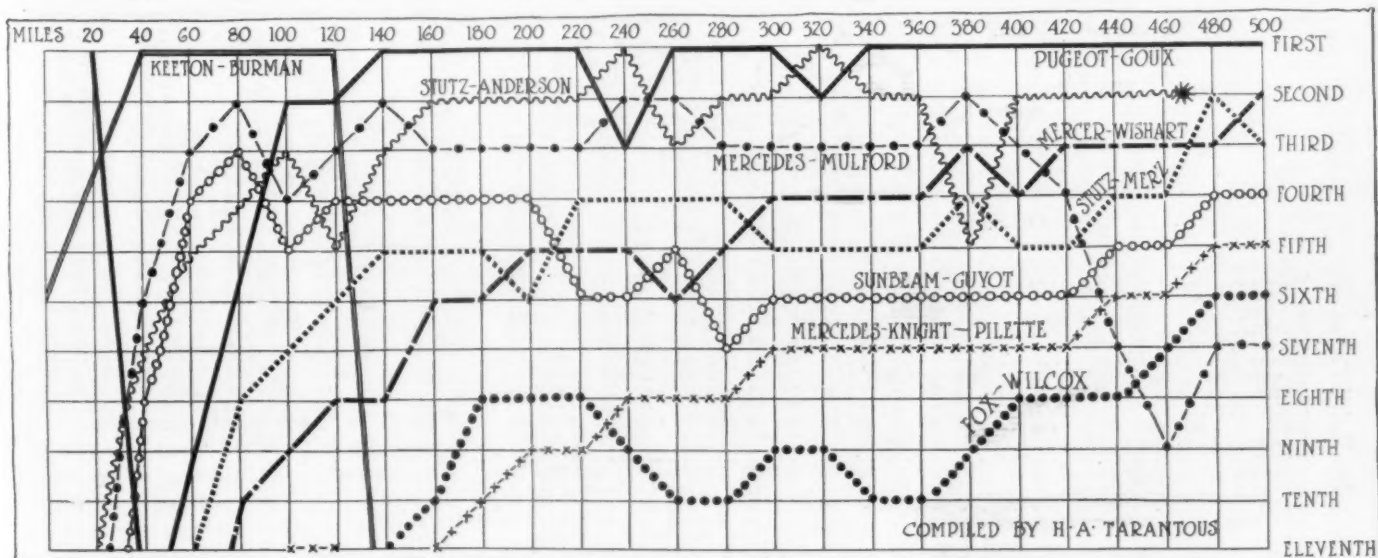
minute separating them for over 300 miles. Merz led his rival by 26 seconds at 100 miles; at 200 Wishart led by a minute and a half; at 300 miles Wishart had his greatest margin, nearly 6 minutes; at 400 miles Merz had reduced it to less than 2 minutes; at 420 miles Wishart led by 9 seconds; at 440 miles he was 58 seconds up;

at 460 it was 51 seconds, at 480 but 29 seconds; and the 35 seconds apart.

Merz's finish was spectacular in the extreme. Just as he got the green flag, meaning that he started his last lap, flame burst out under the bonnet at each side. Simultaneously the cry went up, "He is on fire." All looked for him to stop, but never slackening his pace Merz sped for the finish. Up the back stretch the flames could be seen gaining headway. Everybody wondered could he make it, wondered if the insulation on his wires would bring him to the tape or if second or third position would be snatched from him like de Palma lost a year ago. Every eye followed the white racer around the far turn, back of the bushes and then into the home-stretch. The flames brightened, but Merz held his pace and as he shot over the line with the mechanic vainly endeavoring to keep the flames under the hood he was given a cheer that rarely is accorded to a third-place car. The 35 seconds meant \$5,000, the difference between second and third places.

#### Showing Made by Sunbeam

The Sunbeam winning fourth place gave all the visiting English engineers, the guests of the American Society of Automobile Engineers, a chance to wave their Union jacks from a private stand erected for them close to the timer's pagoda. The running of this car was one of the consistent features of the race. Guyot put it into fourth place at 60 miles and held it

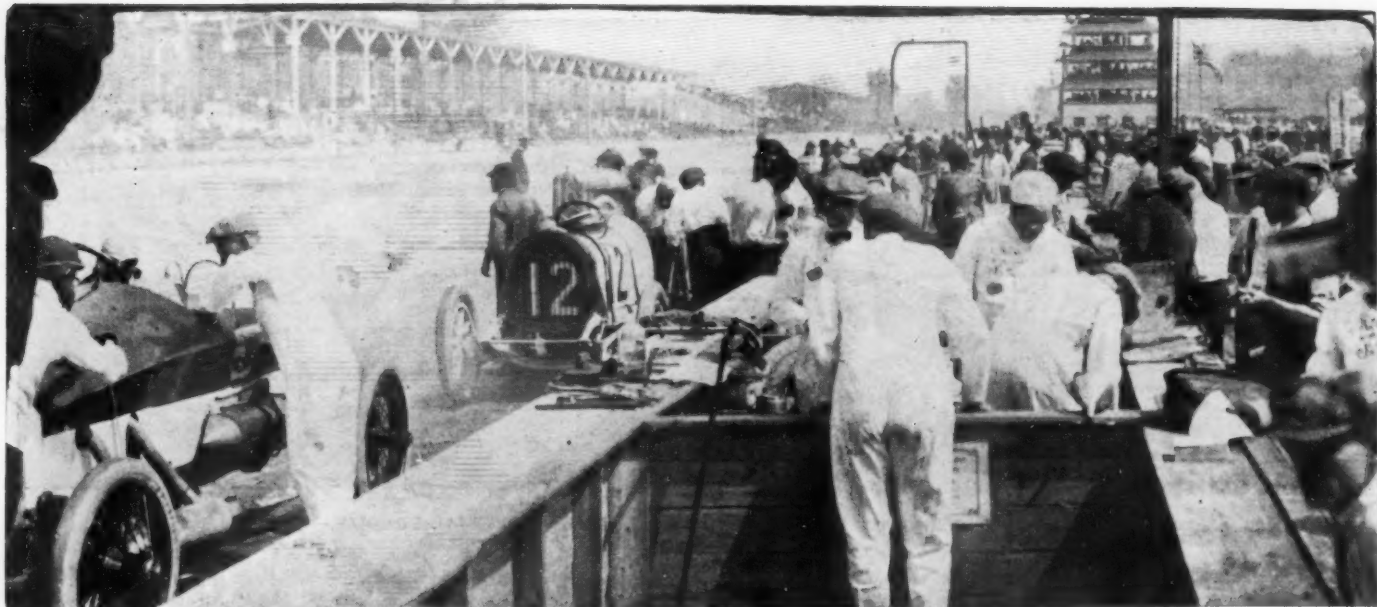












PIT SCENE SHOWING PILETTE'S MERCEDES, WILCOX'S FOX SPECIAL AND GOUX'S PEUGEOT IN ORDER NAMED

## Scenes and Incidents Noted at the Pits During the Race

### Mechanical Troubles as Reviewed by Technical Committee

By Darwin S. Hatch

ONE of the most interesting features of the race was the work at the repair pits where the cars came in for fresh supplies and new tires and for any replacements or adjustments made necessary by troubles developing from the continuous high speed in the 500-mile grind. It is at the pits in a great measure that a race is won or lost. When cars are but seconds apart a minute's delay may mean a differ-

ence of thousands of dollars in prizes, and a moment's miscalculation or a wrong diagnosis of trouble may mean putting a car out of the race completely. Efficient pit work means weeks of training under the highest class of management, particularly is this true in the more frequent and more expected stops necessary for tire

changes and refilling of gasoline, oil and water tanks.

To the Stutz team belongs the palm for quick and efficient pit work and to the men in the Stutz repair pit must be given a great measure of credit for the excellent showing made by Merz's car. In the matter of tire changes particularly did Stutz teamwork show up brilliantly. Tire changes were made in 30 seconds flat in some instances, the car coming to a stop, one tire being taken off and replaced by another and the car getting under way again in  $\frac{1}{2}$  minute. The average time required to change the tires on the Stutz car was about 45 seconds and opportunity was taken during this time to replete the supplies of gasoline, oil and water.

#### Preparation for Fast Pit Work

This showing was accountable, not only to the training of the pit men, but also to the preparation and arrangements that had been provided for fast work. For instance, the jack used was a long wooden lever which lifted the wheels clear of the ground with one movement, an iron strap acting as a catch which was released by a kick and let the wheels which had already been started to spinning down on the ground. The car was really under way before it was off the jack. Another feature of the preparation was the special funnels which could be dropped into the filler opening and the can of gasoline or oil up-ended into them without wobbling so it was unnecessary to hold the funnel, thus relieving one man from the work. Likewise the tools and small parts which might be needed were arranged on the concrete wall next to the track, but were placed at the side of the pit so that a space was left free to allow supplies and the larger tools and

#### EQUIPMENT OF LEADERS IN 500-MILE RACE

Car No.	Tire	Front	Rear	Wheels	Carburetor	Magneto	Spark Plugs	Shock Absorber	Oil
16....	Firestone	Firestone	Firestone	Rudge-Whit.	Claudel	Bosch	Bosch	Hartford	Owl Castor
22....	Michelin	Firestone	Firestone	Rudge-Whit.	Rayfield	Bosch	Bosch	Hartford	Monogram
2....	Michelin	Goodyear	Goodyear	Wood	Schebler	Bosch	Bosch	Hartford	Monogram
9....	Dunlop	Dunlop	Dunlop	Demountable wood	Claudel	Bosch	Bosch	Hartford & Triou	Mobiloil
23....	Michelin	Michelin	Michelin	Rudge-Whit.	Mercedes	Bosch	Bosch	Maybach	Monogram
12....	Michelin	Michelin	Michelin	Wood	Miller	Bosch	Bosch	Hartford	Monogram
29....	Braender	Braender	Braender	Wood	Rayfield	Bosch	Bosch	Mercedes	Oilzum



COOLING OFF PEUGEOT'S TIRES DURING STOP AT PITS

the repairmen to pass over on to the track without having to take care that parts be not knocked off onto the course.

Excellent generalship also was shown in the pit work of the Mercer team, and although changes were not made as quickly as they were in the Stutz pits, yet stops for tire change and water, gasoline and oil required on an average only a minute and a quarter. The Mercer people had difficulty with their jacks, as the large lever jack did not seem to work on Wishart's car as well as it should have and the little hand jacks were too slow for speedy tire changes.

The Peugeot had a method of jacking that made for quick changes when two tires were to be replaced on either the rear or front axle. With this a single jack of the long lever type was slipped under the differential housing and the entire rear axle lifted in one operation so that both the right and left tires could be changed simultaneously. The first stop of this car consisted of changing both rear tires and taking on gasoline and oil and the car was on the way in 1 minute and 43 seconds.

#### Five Without Mechanical Trouble

Tire troubles were the chief causes for stops, due to the fact that the day was warm and also that the track was quite oily. When a car would run off the oily spot on to the rougher portion the tread would be rasped off, which made for short tire life. Tire troubles in detail will be taken up under a different heading. So far as mechanical troubles were concerned, there were five cars that came through with clean scores and four of these were the ones that finished 1, 2, 3, 4 in the race. Goux's Peugeot, the Mercer 22, Merz's Stutz, the Sunbeam and Clark's Tulsa did not have to stop at any time during the 500 miles for mechanical adjustments.

The only difficulty encountered by the Sunbeam was in the sticking of the hub retaining nut when one wheel was to be replaced. The Mercedes-Knight came very close to finishing without difficulty, but on its last few laps had a stuck float valve. Pilette used only 25 gallons of gasoline in the 500 miles, getting 20 miles to the gallon.

This car probably has the record for oil economy as well as fuel economy, only 8 gallons of oil being used throughout the run, whereas many of the cars used several times that amount. One car, for instance, consumed 104 gallons of lubricating oil in the 500 miles. The little Mercedes-Knight did remarkably well also from the standpoint of cooling. No water was taken on during the race and at its end the water level was up to the screen in the filler cap. There was a Motometer, a thermometer which indicates the temperature of the cooling water, on the radiator cap, and at no time during the race did the water rise above a temperature of 130 degrees. This car was a racing body on a chassis which had done 9,000 miles as a touring car.

Troubles with the gasoline connections

### COMPARISON OF SPEEDWAY TIME THIS YEAR AND LAST

Miles.	1912.	Driver.	1913.	Driver.
40	29:19	DePalma	31:10	Burman
60	43:59	DePalma	46:13	Burman
100	1:13:01	Brown	1:16:35	Burman
140	1:41:52	DePalma	1:48:48	Goux
160	1:56:15	DePalma	2:06:21	Goux
200	2:24:47	DePalma	2:36:07	Goux
240	2:56:22	DePalma	3:09:49	Goux
260	3:10:50	DePalma	3:24:34	Goux
300	3:43:21	DePalma	3:56:59	Goux
340	4:12:47	DePalma	4:28:04	Goux
360	4:26:53	DePalma	4:44:17	Goux
400	4:56:34	DePalma	5:14:35	Goux
440	5:27:10	DePalma	5:47:33	Goux
460	5:43:14	DePalma	6:02:35	Goux
500	6:21:06	Dawson	6:35:05	Goux

seemed to be the most frequent of any of the mechanical difficulties. The extreme vibration of the cars over the brick track at high speed played havoc with gasoline tanks and gasoline piping. In several instances flexible conduit had been employed to carry the gasoline from the tank to the carbureter, but this conduit seemed to break with as great frequency as did the stiff copper tubing ordinarily employed. The pounding of the cars started the rivets in the gasoline tanks and caused leakage in several of them. In fact, this very difficulty was the cause of the withdrawal of two of the Isottas. A broken gas lead held up the Fox Special for 3 minutes during the early part of the race. The No. 10 Henderson, along with its other difficulties, had difficulty with a break in the flexible conduit which led the gasoline from the tank to the carbureter. Burman's Keeton also developed a leak in the gasoline tank, but a wad of chewing gum plugged up the hole successfully.

#### Clutches Persistent Offenders

Next to difficulties with the gasoline line, slipping clutches were the most frequent cause of trouble. The Henderson was forced to spend nearly 20 minutes altogether in trying to adjust the clutch so that it would hold. Frequent applications of gasoline with a squirt gun were necessary and every few laps the treatment had to be repeated. Knipper, a large portion of the time before his withdrawal, was on

his back under the car. The difficulty was relieved temporarily by driving in pieces of saw blade in the leather facing. Disbrow's Case also was bothered with a slipping clutch and lost 2 or 3 minutes on this account. The Mason No. 35 made eight stops after running about 200 miles, on account of clutch slipping. Saw blades wedged into the facing gave temporary relief, but slipping continued in less aggravated form.

#### Valve Trouble Comparatively Rare

There was not as much trouble with valves and valve-operating mechanism this year as during last year's race, in spite of the fact that the motors were run at a higher speed than they were a year ago. Wilcox's Fox Special had to replace a rocker arm in one cylinder and had to change exhaust valves in two cylinders. No. 3 Stutz broke its camshaft, the only mechanical difficulty it had. This break occurred when the car was in second place, but was sufficiently serious to put the car out. Liesaw's Anel had valve trouble and the exhaust valve had to be changed. It was found necessary to adjust the rocker arms on Trucco's Isotta and occasion was taken at the time to remedy the leak which was beginning to show itself in the gas tank. Before Trucco finally withdrew the gasoline was leaking in a sheet clear across the rear end of the car from the open seam.

Carbureter troubles affected several of the



BURMAN AND TRUCCO AT THE PITS



cars and this difficulty and a stopped gasoline line were the only ones which Mulford encountered, except for running out of fuel, which lost him his place.

One stop was made necessary by a slight carbureter adjustment. Burman's chief difficulty was occasioned by carbureter troubles and he lost 21 minutes in changing carbureters shortly after noon. This, together with another 21-minute stop to fix the gasoline tank, lost him his position of leader which he had held up to that time and dropped him down to sixteenth place. Knipper's Henderson had to stop two different times, losing in all 7 minutes, on account of carbureter adjustments.

#### Two Cases of Steering Troubles

Difficulties with the steering gears occurred in only two instances, Disbrow's Case losing a nut off the tie-rod bolt and Burman having to replace a bushing on the steering gear. Burman's trouble was to be expected inasmuch as he had broken a steering gear twice in practice and his final adjustments on a front axle that had just been put in that morning made him late at the start.

Lubrication troubles, while they were not the direct cause of any of the stops at the pits, were responsible for some of the difficulties already enumerated, also for breakdowns which put out at least eight of the cars which failed to finish. The burned-out bearings on Nikrent's Case, Zucarrelli's Peugeot, de Palma's Mercer and Harry Endicott's Schacht, which were responsible for the withdrawal of these cars, probably all can be laid to insufficient lubrication. The same cause probably was primarily the reason for the broken camshaft on Anderson's Stutz, the loose connecting rod in the Anel, the broken pumpshaft in Bragg's Mercer and possibly the broken transmission shaft in the Nyberg.

## Four Pilots Drive Complete Race

FOR the first time in the history of the international sweepstakes, the winner has driven the 500 miles without relief, Jules Goux setting such a record last Friday when he refused to surrender the wheel of the powerful Peugeot to either Zucarrelli or a pit helper but guided the blue monster 200 times around the brick oval.

In the two previous races, the drivers of the winning cars were called to the pits and given an opportunity to rest and recuperate while an assistant was entrusted with the machines, Ray Harroun giving way to Cyrus Patschke in 1911 and Joe Dawson being relieved by Don Herr in 1912.

Of the twenty-seven contestants that faced Starter Root at 10 o'clock in the morning, fourteen accepted relief before they were eliminated by mechanical trouble or the race was declared off. Four of the ten finishers—Goux, the winner; Guyot, the Sunbeam driver; Pilette, who won fifth money in the Mercedes-Knight; and Ralph Mulford, who crossed the wire in seventh position with the Mercedes—tooled their mounts the entire distance, a tribute to the stamina of the foreign driver since three of this quartet are aliens.

The other six drivers in whose grimy faces the checkered flag was waved accepted relief as follows: Wishart from de Palma, Merz from Cooper, Wilcox from Fox, Disbrow from Kilpatrick, Clark from Alley and Haupt from Lee Oldfield. Bob Burman, whose Keeton was the only car running when the race was called, also vacated the driver's seat, giving Hughie Hughes, former head of the Mercer team, an opportunity to chase the foreign invaders.

Of the remaining sixteen cars that were docked disabled before the race was over, seven were guided for a time by relief drivers—Endicott's Nyberg by Ed Madden, Anderson's Stutz by Earl Cooper, Bragg's Mercer by de Palma, Knipper's Henderson by Harry Grant, Liesaw's Anel, Evans' Mason by Oldfield and Nikrent's Case by Eddie Hearne.

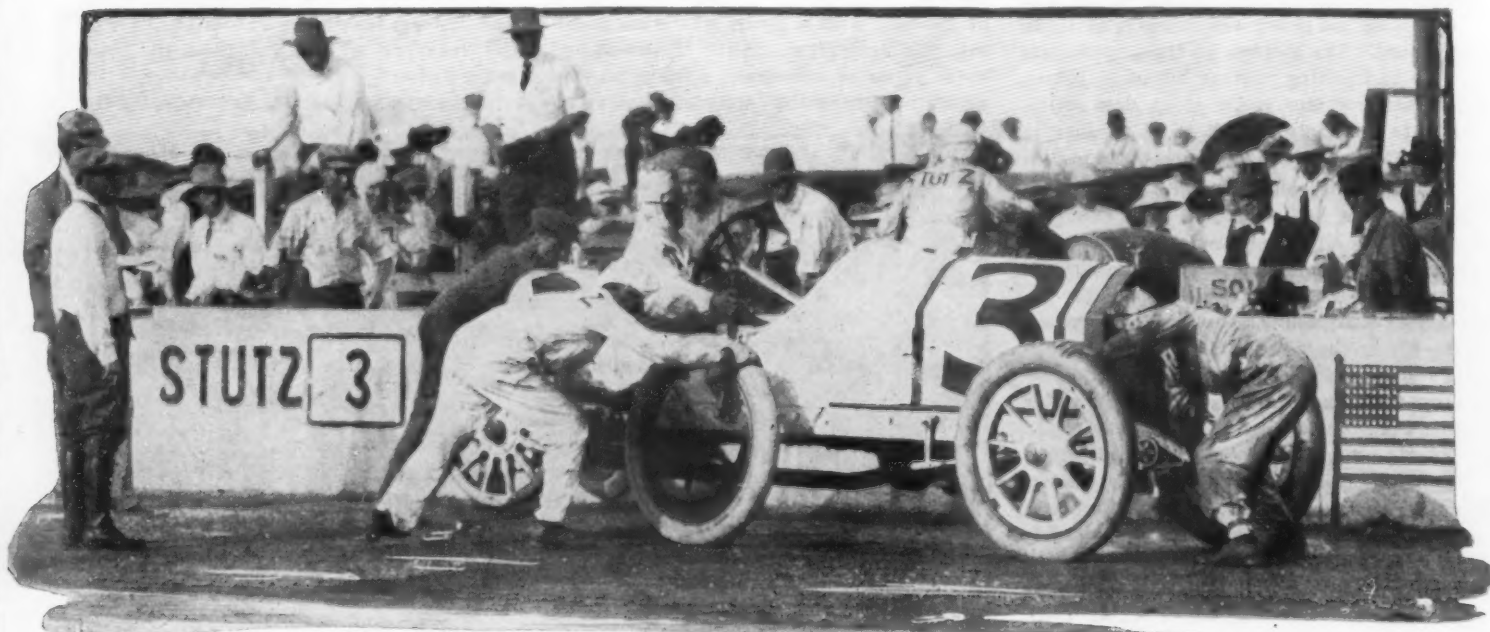
The drivers who sat in the seat without relief from the time the starting bomb exploded until their cars were abandoned at the pits and sheds exhausted were Tetzlaff, Trucco and Grant of the Isotta team; Jack Tower whose Mason skidded off the track on the fifty-first lap; Bill Endicott, the least fortunate of the Case musketeers; Johnnie Jenkins, the Schacht pilot; Ralph de Palma, who rendered help instead of receiving it; Zucarrelli, Goux's teammate; and Bob Evans who traveled 158 laps before the Mason was eliminated.

De Palma spread his relief over the most cars, driving both Bragg's and Wishart's Mercers and bringing the latter's machine up from seventh to third place.

Cooper's relief work was the most spectacular for in the 27 minutes he was at the wheel of Anderson's Stutz, he cut down Goux' lead from two and one-half laps to  $4\frac{1}{2}$  minutes.

Grant's relief work was the most extraordinary, Harry starting the race as the regular driver of the Isotta, and being engaged as first assistant to Billy Knipper after the Italian entry was docked with a broken gasoline tank.

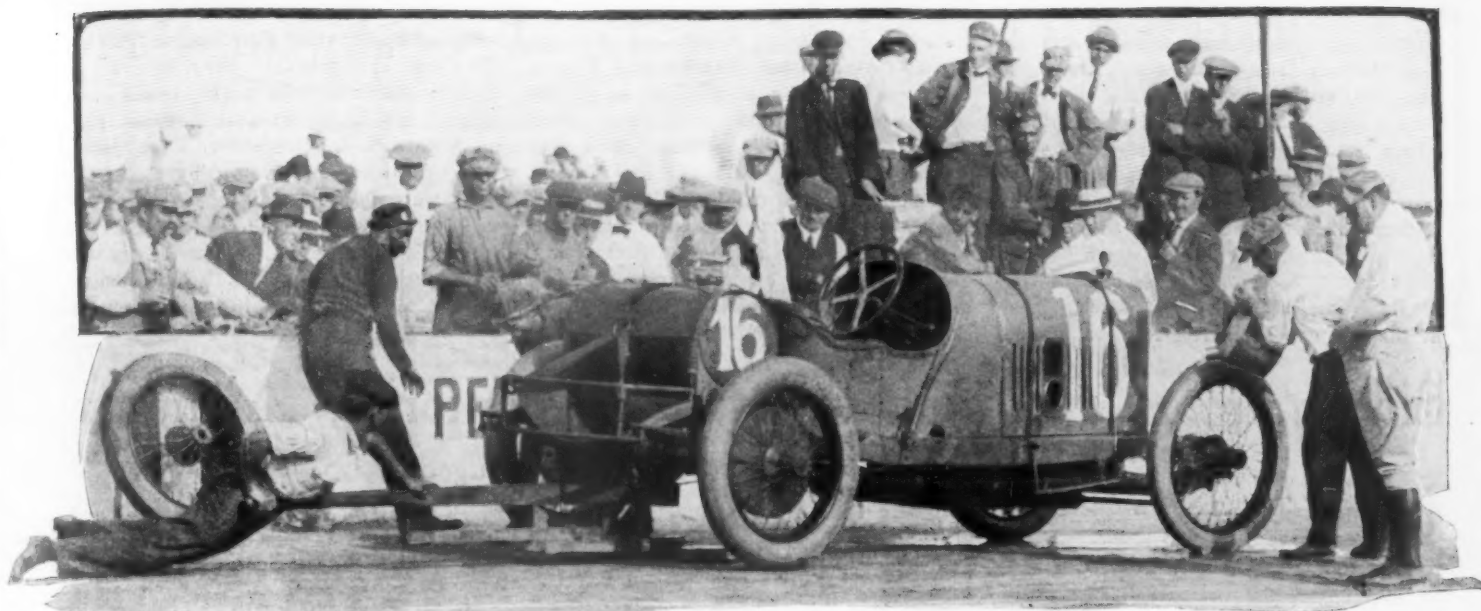
Hughes' relief work was the most unexpected for it was unannounced that Burman would drive the entire distance and few saw Lord Hughie until he stepped into the Keeton and roared away, to be flagged before it completed the distance.



Photograph by Underwood & Underwood, New York

THRILLING SCENE WHEN ANDERSON DISCOVERS BROKEN CAMSHAFT AND IS FORCED OUT OF THE RACE





Photograph by Underwood & Underwood, New York  
GOUX'S HELPERS WASTED NO TIME IN MAKING TIRE CHANGES

## Eighty-Eight Tires Changed During the 500-Mile Race

### Estimated Cost of Casings Placed at \$3,500

**T**IRE troubles constitute one of the chief sources of delay to contestants in a race of a distance as great as that of Friday's 500-mile event. This phase of such a contest tends to reduce the speed of the race very greatly. Not only does the time necessary for tire changes increase the car's running time by just the total length of the stop for tire replacements, but also drivers in order to save their tires will drive at a more conservative speed than if this were not a consideration.

A total of eighty-eight tires was worn out during the race. This means an outlay for tire equipment alone of between \$3,000 and \$4,000. Tires were eaten up more rapidly this year than in previous speedway races for two reasons: one, because the day was quite warm and the tires heated up rapidly, and the other, because there were oily spots on the track in which the tires got to spinning and when the rough, unoiled surface was encountered, the tread was ground off quite rapidly.

As might be expected, the right rear tires were the ones that suffered the most. This was because the cars travel with the left wheels nearest the pole so that the right wheels have the greatest distance to go. As the rear wheels are the ones which take the load of driving the car as well as carrying their share of the weight the tires on the right rear wear out the most rapidly. Likewise the right front tires are worn much more rapidly than are the left forward tires. About four times as many right forward tires were changed as left forward. About three times as many right rear tires were changed as left rear. To get down to exact figures, the ten cars that finished together with the two contenders, Anderson's Stutz and Burman's

Keeton, used in all fifty-eight casings. These were divided among the four wheels as follows: Right rear tires, twenty-nine; left rear tires, eleven; right front tires, twelve, and left front tires, three.

Ralph Mulford holds the record for tire service, running the entire 500 miles on the same set of tires, which at the end of the run seemed capable of 200 or 300 miles more. These tires were Braender tires, which made their first appearance in racing on Mulford's car last Friday. Disbrow's Case was nearly as fortunate, making the complete run with only one tire change. This was a right rear, and occasion was taken while the change was being made to replenish the supply of gasoline and water. The Tulsa, driven by Clark, wore out only two tires, the two changes being made in an average of 55 seconds time. The Sunbeam was fortunate in having to replace only three tires, all of them rear tires, one on the right and two on the left side. This car was fitted with demountable wooden wheels and a tire change was accomplished in the same way as with the demountable wire wheels, the entire wheel being removed.

Goux's Peugeot wore out seven tires in all, three on the right rear, two on the left rear and two on the right front wheel, the tire on the left front going through without change. Time lost on account of these changes totaled 11 minutes, although occasion was taken to fill up gasoline, oil and water tanks.

Wishart's Mercedes made the run with five tire changes, and losing about 5 minutes and 30 seconds on this account and averaging just a little over 1 minute for each change. Merz changed as many tires as did Goux, but he lost only 5 minutes on

this account, changing in about one-half the time that Peugeot changes were made. His average for the seven changes was 43 seconds, as against 1 minute and 15 seconds per change for Goux.

Pilette in the Mercedes-Knight hoped to make the entire distance of 500 miles without a stop. This he figured he would be able to do by conservative driving cutting down his tire wear and carrying supplies of fuel and oil sufficient for more than the total distance of the race. However, he ground off the thread of one of his tires at one point in the race when running from an oily spot to a bare spot on the track and, believing that the tire would not hold up for the distance in its weakened condition he stopped for a change.

Heat caused the pressure of the air in the tire to increase to a point beyond the safe inflation pressure, so that blowouts occurred simply from the enormous pressure of the air. In the Mercedes-Knight Pilette found after he had run the first 130 miles that three of his tires were getting too hard on account of the increased pressure caused by the heat. He stopped at the pit and changed them, though they showed little signs of wear.

These tires had been pumped up originally to only 50 pounds pressure, but after 2 hours of driving the pressure had risen to between 85 and 100 pounds.

The Fox Special ate up seven tires during the race, but they caused a total delay of less than 6½ minutes, the car being held about 50 seconds for each change. The Mason car, driven by Haupt, had to replace six tires in all, four of which were on the right rear wheel. These caused a total delay of 5 minutes. Anderson's Stutz holds the record among the contend-

ers for the number of tire changes required. Nine tires in all were changed on this car, six of them being on the right rear wheel. The excellent pit work of the Stutz team, however, made up in part for the tire wear and the car was delayed for only about 45 seconds on the average.

Burman changed but three tires before he was flagged, only one of which was on the front. The cause for his lack of tire trouble, particularly on the forward end of the car may be ascribed in part to the

fact that his front wheels are about 3 inches further apart than his rear wheels.

It was a matter of question as to the effect wire wheels would have on tire wear and it was expected that this year's race would be of some value in determining just how the wire wheels would affect the life of casings in the race. However, the results of the race are not such that any definite statement can be made either for or against wire wheels as tire savers. Of the ten cars which finished, three of them

were equipped with wire wheels and all three were well up in the money. The winner, Goux; Wishart, who took second, and Pilette, who captured fourth money rode on wire wheels, the other seven being equipped with wood wheels and those of the Sunbeam with the demountable type. Seemingly the wire-wheeled cars suffered as much from tire wear as did the others and it required just as long a time to remove and replace a wheel as it did a rim on the wooden wheel.

## Sidelights on Big Race by French Motoring Authority

### Charles Faroux Describes the Winning Peugeot

**M**OTOR AGE, which is well known among the French motoring fraternity as one of the greatest authorities on motor cars in the world, has been kind enough to ask me to say something in my capacity of consulting engineer to the Peugeot factory as to what I thought of the Indianapolis speedway race. I accept with much pleasure its very friendly invitation.

Before everything else, I must, in the name of the European team, express our common gratitude to the directors of the Indianapolis race for the courteous reception accorded us. We have been deeply affected and feel very grateful to the Americans for the perfect sportsmanship. Carl Fisher and Charles Sedwick showed themselves race directors of whom Europe may well feel envious. For 15 years I have attended every big racing event on the continent, and I never have in that experience seen a contest that could be compared with the race at Indianapolis.

The course itself is excellent, excelled only by that at Brooklands. The only objectionable feature is that it does not permit a high rate of speed on the banked turns. The record of Dawson will be a hard one to beat. To better his mark a car will need to be built especially for the track, such a car as we will bring over next year. It will be a hard matter to excel Dawson's record under weather conditions similar to those of last Friday. The excessive heat was too hard on tires.

Actually the speed limit is such that a motor with 450 cubic inches cylinder capacity never is called upon to develop its full quota of power. Conditions of the Indianapolis track prevent the Peugeot motor from going the limit. For example, the car of Goux is designed to make about 115 miles per hour, the motor revolving 2,250 times per minute developing 162 horsepower. Now during the race Goux never utilized more than 125 horsepower and never was able to exceed 1,700 revolutions per minute. Goux's car is equipped with a registering device from which it was possible to determine the above figures.

Let us suppose now that someone should bring out in 1914 a cylinder with 350

Editor's Note.—The accompanying article is from the pen of Charles Faroux, editor of La Vie Automobile, of Paris, France, and consulting engineer of the Peugeot company. It was written exclusively for Motor Age.

cubic inches piston displacement. The car would generate the same power and speed enumerated above and the motor would undergo the stiffest test possible. I believe that in America as in France what is demanded above everything else in a race is serious instruction—to see primarily a car forced to the very limit of its endurance, not merely to see it win. I suppose, however, that Motor Age desires above all of me some consideration of technical features and not a description of the race.

The Peugeot factory constructed in 1912 three cars identical with that used by Goux. These cars have been entered in eleven contests and never have been defeated. Perhaps Americans will read with some interest a few details of their construction.

The motor is a monobloc with a  $4\frac{1}{4}$ -inch bore and  $7\frac{3}{4}$ -inch stroke. There are four valves to every cylinder, two for intake and two for exhaust. The diameter and the lifts are the same— $2\frac{1}{8}$  inches in diameter and  $2\frac{5}{8}$  inch in lift. The valves are inclined at a 45-degree angle, opening in the front of the cylinder and being governed by two cams. The cranks and pistons are made of B. N. D. steel. In all our cars we make use of this kind of steel which is the best we know of in Europe. It permits of the making of parts with inconceivable lightness.

This motor on a dirt track has developed 162 horsepower at 2250 revolutions per minute under the best conditions. In this test consumption of fuel and oil was comparatively small. On the other hand Goux in 500 miles at Indianapolis used 50.7 gallons of gasoline and 8.5 gallons of oil, about 10 miles per gallon of fuel.

The clutch is of the multiple-disk type, and the gearset has four speeds forward. The transmission is of the type recommended in Europe today as the best. For certain reasons I am unable to give you here the pattern of the Peugeot motor

which is designed along very extreme and unique lines as will be noted when it is understood that the intake valves and exhaust valves are open at the same time.

There was not a minute at Indianapolis but what we thought we were going to win, although the accident to Zucarrelli, caused by a back-fire, put our fastest car out of the race. We recognized however, that we had some dangerous opponents. We particularly feared the Stutz, which are very durably constructed, likewise the Mercers, which were made by a man who well knows his business. As for the other entries we feel that they were not adequately prepared.

Zucarrelli in a secret trial made at 5 o'clock in the morning of May 25 made three laps in 4 minutes 48 seconds.

Goux and Zucarrelli had to keep their speed down in order not to wear out their tires. As for Goux all went well, and at the end of the race he was sailing along tranquilly. Burman who was way behind in the race tried his best to engage Goux in a battle of speed, but Goux knowing all the ins and outs of his profession left Burman to amuse himself alone.

Since my last trip to the United States the Americans have made considerable progress. I much admire the construction of the Stutz and Mercer cars and the lines of the Keeton.

You have excellent drivers over here: De Palma, Merz, Anderson, Burman, Wishart and Bragg knew the track as well as they did their cars. It would require our Boillot to beat them.

I want to rectify some common mistakes made about our Peugeot racing team. The Peugeot cars were completely designed according to contract with Zucarrelli and Boillot, by an engineer of very great ability named Henry. These three men, Goux, Zucarrelli and Boillot, traveled together from one year's end to the next. Zucarrelli is a mechanical genius; Boillot is without superior when it comes to carrying out orders of others; Goux is likewise a driver of the very first order.

I want to add that Zucarrelli and Goux treat their mechanic's like comrades,—not like servants.



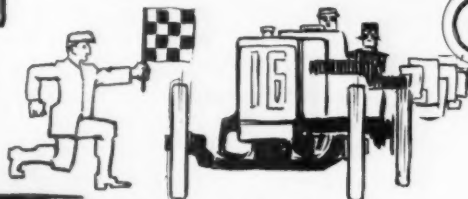
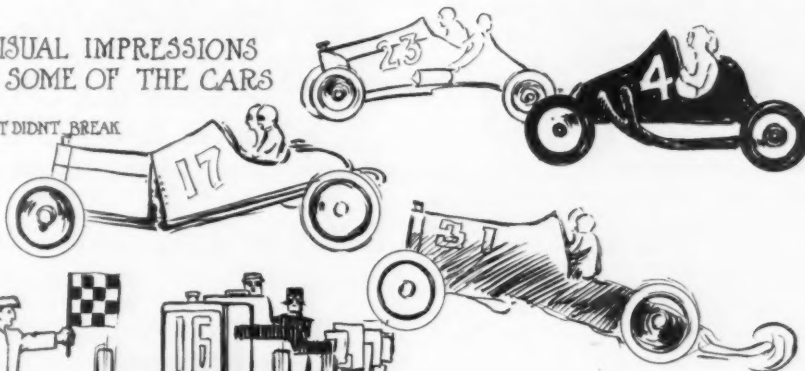
# Speedway Race Through the Eyes of Artist Wilder



DEVOTTES OF THE SPORT  
WERE EASILY DISTINGUISHED  
BY THEIR BRILLIANT COMPLEXIONS

## VISUAL IMPRESSIONS OF SOME OF THE CARS

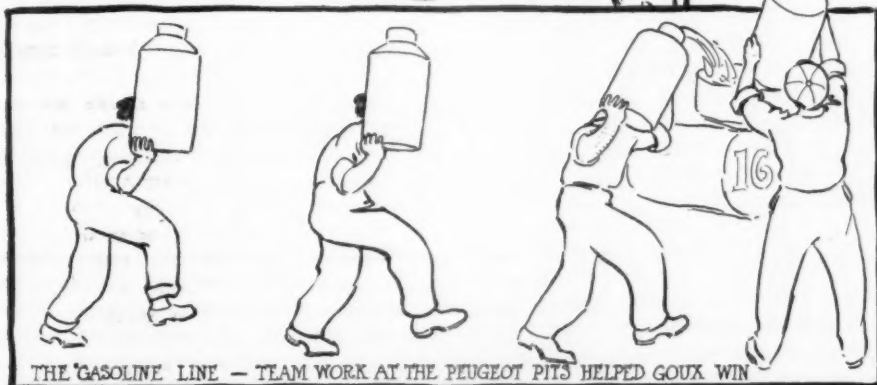
LUCKY IT DIDN'T BREAK



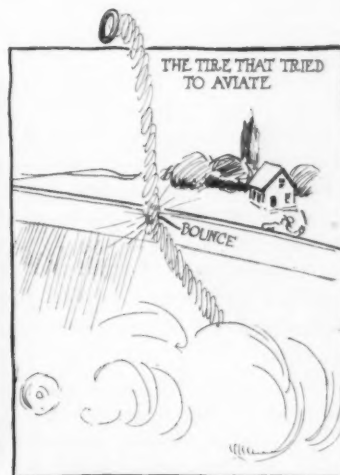
A GREAT VICTORY FOR THE CUBISTS



A FAMOUS  
PUMPING ARM



THE 'GASOLINE LINE' — TEAM WORK AT THE PEUGEOT PITS HELPED GOUX WIN



THE TIRE THAT TRIED  
TO AVIATE



TOM WILDER

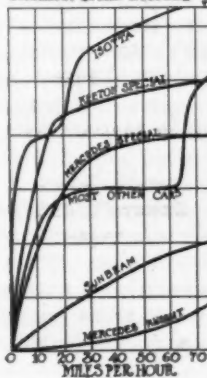
THE HEROIC STEVENS-MECHANIC  
TO MILFORD-MARATHONED A MILL  
ACROSS THE FIELD FOR GASOLINE  
FALLING EXHAUSTED AT  
THE PITS



NOT A DANGEROUS  
LUNATIC - ONLY A  
VISITING NEWSPAPER  
PHOTOGRAPHER  
TRYING TO GET THE  
FINISH

## NOISE CHART

COMPILED BY DAKIN S HAMMER



NOISEMETER BROKE HERE

GIANT CRACKERS 80%  
GATLING GUNS 20%

GATLING GUNS

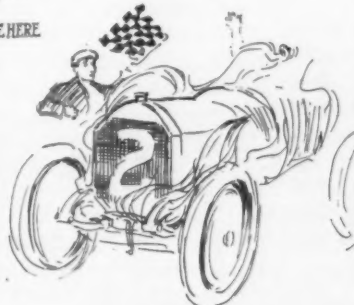
OLD TROWARD BRICKS  
FALLING DOWN A  
TIN CHUTE

BOILER FACTORY

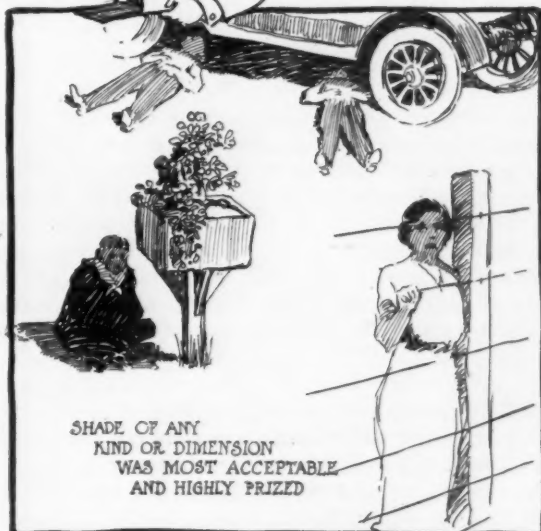
MUFFLED  
BOILER FACTORY

WHIR OF A  
SEWING MACHINE

EXTREME SILENCE

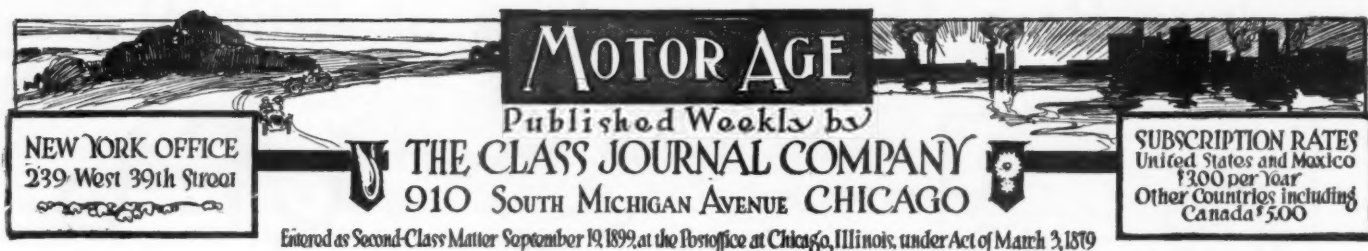


MEX'S STUTZ FINISHED THIRD  
IN FLAMES - WAS THIS A  
'BLAZE OF GLORY'?



SHADE OF ANY  
KIND OR DIMENSION  
WAS MOST ACCEPTABLE  
AND HIGHLY PRIZED





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## "A Stitch in Time Saves Nine"

**L**AST week's 500-mile race has once again demonstrated the folly of entering a race without cars tuned to the minute and thoroughly tested by weeks and months of previous driving over roads. The bad showing made by so many entrants was not due to faulty design or faulty construction, but rather to a failure to get the parts into racing condition. Such unpreparedness always has been with us. We had hoped that our makers would profit by experience, but it seems that as years go by conditions go from bad to worse.

**I**T really is difficult to know just why such unpreparedness should continue to exist. With a few factories this is a very busy season of the year, and they have not had sufficient time to thoroughly test out the latest creations. This accounts for a few of the examples of unpreparedness of last Friday, but not for all. Some makers never have learned the lesson of early preparation. With them it is impossible to operate other than in a hand-to-mouth method, and whenever they do so they must pay the price. It is to be hoped that next year our entrants will not be working night and day during the last week, but that they may get on the ground 3 weeks in advance and be ready for the race at least 5 or 6 days previous to the start. This year the winner was one of the early drivers at the speedway, and whatever weaknesses existed in his machine were discovered by him a week in advance, so he was ready for the race.

**M**ORE or less disappointment goes with every reduction in speed, and the fact that this year's average is under that of last year has a tendency to detract from the race because of the slower pace. This was anything but the case. Few if any were able to compare pace to the extent of a few miles per hour less or more. Interest in a race always centers in competition among a few leaders, and the closer this is the greater the enthusiasm. This year's race was much more interesting than that of a year ago, because it was a much-mooted point as to who was the certain leader until after the 400-mile mark had been passed. With the leadership changing every 50 or 100 miles there is certain to be much greater interest than where the pace may be faster but one car is liable to maintain a lead that it is well nigh impossible for the others to overcome.

**T**HE victory of a Frenchman driving a French car is going to have a salutary effect on speedway racing. Goux's victory will mean that next year many foreigners will bring their best racing creations to the speedway in the hope of carrying away a goodly portion of the \$50,000 prize money. Americans are going to find it harder to hold their own next year than this season. The foreign invasion will mean that home entrants will have to get into training much earlier than this year, and further, that their cars must be completed months in advance of the day of racing.

**F**OREIGN victories on an American track are certain to result in considerable advertising to the European product, and this taken in conjunction with a possible reduction of the tariff as proposed under the Underwood schedule will make the sky look clearer to the foreign producer who has his eye on America than it has for several seasons.

**T**HIS year's race has demonstrated that a 450-cubic inch car can be made to go practically as fast as a 600-inch one, although the pace this year was slower than that of a year ago. It is clear in the minds of the majority that Goux could have made a faster pace had he been forced to. It also is certain with many that several drivers started out to finish in the money rather than drive a spectacular race for a few hundred miles and drop out before the finish. The majority of them were playing a safe and sure proposition. The dollars in the prize money appealed to every driver on the course. The slippery condition of the track held the speed down considerably. Last year only the curves were dangerously slippery, but this year the long straightaway stretches became alarmingly bad. This cut the average down. The additional oil on the track was due largely to the extra quantities being fed to the motors of several contestants, who realized that extra oil was the only assurance of being able to finish the race. They looked to oil to take the place of working in on a green motor. The argument also has been advanced that the bricks of the speedway have been absorbing oil during the last few years and that naturally they are approaching the saturation point, and further that in the hot noonday this oil is drawn out the same as oil on a newly sprinkled roadway. This one fact alone had its effect on the pace of the contestants.

**T**HE mechanical lessons of the race are not so numerous as they were a few years ago. The days of broken springs, broken axles and broken steering parts are largely over. Carburetion gave much of the trouble last week, with some the gasoline being apparently at fault, with others the gasoline line and with others the gasoline tanks. All of these troubles would have been eliminated had more practice work been done. There were several cases of shafts breaking, incidents scarcely heard of in previous years, but in nearly every case the trouble could be traced to a lack of adequate lubrication of the parts. Lubrication is all-imperative in long-distance racing, and its importance is accentuated in the present motors, because they are smaller in capacity but operate at higher speeds than a year ago.

**T**HE higher speed must be cared for. Not only must the cylinders and pistons be oiled more, but the crankshaft bearings, the connecting rod bearings and the camshaft bearings must receive sufficient oiling. The events of last week mean that forced feed oiling will come in for greater consideration next year than this. Splash oiling is not enough for such a race on such a course. Oil should be fed under pressure to all of the motor bearings. The French learned this in racing years ago, and they are reaping the results of their experience now. Our makers must sooner or later recognize the importance of such.

**L**ITTLE weight can be given to the argument that interest in racing is dying out. The attendance this year was greater than ever before, approximating the 100,000-mark. The public, if Indianapolis can be taken as a criterion, is more interested in racing than it was a year ago. The public wants competition, and if Indianapolis can get a good list of entries of both domestic and foreign cars for 1914 there is not a question of doubt but that the attendance at the sweepstakes next season will show a little gain over that of this year.

# Iowa Farmers Preparing for Big Road-Dragging Jubilee

**D**ES MOINES, Ia., June, 1—The dragging of the roads of the state as the most patriotic way of celebrating flag day, Saturday, June 14, has been approved by the state highway commission, which has named that day as drag day for Iowa. Considerable success has attended the road-drag jubilees held in several live Iowa towns, and the highway commission believes that the time is ripe for the farmers of the state to unite in one grand road-dragging jubilee.

The commercial clubs in the various cities over the state, as well as the farmers, have been requested to get behind the movement. The advisability of the commercial clubs offering prizes for the joint celebration day has been suggested by the commission. Every farmer in Iowa is asked to decorate his team with an American flag and drive it to the nearest market place hitched to an old fashioned King drag. The universal display of the flag and the drag should make the jubilee a great success, members of the commission believe.

The merchants of Stuart, Iowa, gave an impetus to the plan of having road drag jubilee early in the month. Prizes were offered for the farmers who drove the longest distance, were the first to arrive, drove the largest team and a dozen or more classes. Scores of farmers turned out to drag the roads, and a little later other Iowa towns began falling into line. Centerville had a big road drag jubilee and many miles of highway were put in excellent shape. The idea spread from Iowa into Missouri and within the next few weeks scores of road drag jubilees will be held over the middle west.

## ADVERSE LEGISLATION BEATEN

Boston, Mass., June 2—The motor truck bill to tax commercial vehicles \$5 per ton, and the proposed 25-mile-an-hour law, two of the pet projects of the Massachusetts highway commission, are now apparently defeated for this year at least due to the indefatigable efforts of the committee representing users and dealers, in the face of what seemed overwhelming odds. As a result there is much to be thankful for and owners and dealers here are breathing easier. The 25-mile-an-hour law went through the house with a whoop, the vote for it being 3 to 1, but when it reached the senate it failed to pass the third reading, but reconsideration was moved. This has not been acted upon yet, so the chances are that it will not be.

Because the speed bill got such a big vote in the house the truck committee felt that the commercial vehicle measure had a good chance of passing there. The senate already had passed it to be engrossed, and the bill got two readings in the lower branch. Personal letters were sent by some of the committee mem-

bers to representatives in the legislature the day before the third reading. Then the bill was brought up on Thursday. Chairman Collins of the house roads and bridges committee, who had pushed through the speed bill, and who was one of the strong advocates of the truck fees being increased over the agreed upon measure of \$2.50 a ton, immediately got busy. But the friends of the industry also got busy. Amendments were offered to test out the strength of the house on the matter, but these were all defeated, and then on a voice vote the bill went down to defeat. A roll call was demanded and the friends of the bill showed up even stronger, for 126 voted against it to 66 for it, much to the surprise of the members of the roads and bridges committee. Nothing was said about reconsideration, and so it is not thought that any further action will be taken.

It was a tremendous victory and shows what may be done by united effort. The committee responsible for winning this fight comprised Day Baker, General Vehicle Co.; John B. Sullivan, Jr., counsel for the Boston Automobile Dealers' Association; Josiah S. Hathaway, of the White Co.; L. R. Speare and James Fortesque of the Massachusetts State A. A., and James T. Sullivan, motor editor of the Boston Globe.

## MAY NOT GET MONEY BACK

Jackson, Miss., June 1—Whether the owners of Mississippi who have paid the license tax, which was declared unconstitutional by the supreme court of the state last week, will get their money back is problematical. State Auditor Thompson declares that he has no authority to refund any of the money that he has collected. The only precedent that can be found is a case 25 years ago when a license of \$25 was assessed against traveling salesmen. This sum was collected from a large number of drummers before the tax was declared un-

constitutional. The amounts collected never were refunded.

In order to settle the question of a license or other tax that may be levied on motor cars it is likely that the subject will be brought up at the special session of the legislature, which meets this month to pass on a state bond issue.

## MIDLAND GOING INTO BANKRUPTCY

Moline, Ill., June 2—Creditors of the Midland Motor Co., of Moline, who recently applied for a receiver, debated a proposition to take over the concern and operate it, but the majority were opposed and the company will go through the bankruptcy court. The creditors who applied for a receiver included the Empire Rubber and Tire Co. of New Jersey, the Universal Rim Co. of Illinois and the Gates Mfg. Co. of Indiana.

## GRANT COMPANY FORMED

Detroit, Mich., June 2—The Grant Motor Car Co. has been formed and papers of incorporation filed with the secretary of state. At the election of officers George D. Grant was made president of the new company; Charles Grant, vice-president; D. A. Shaw, secretary and treasurer; George S. Salzman, factory manager, and James M. Howe, chief engineer. No factory site has yet been decided upon, but it is expected that within a short time a building suitable for production in large quantities, will be selected. The car is called the Grant and is a cross between a cyclecar and a roadster. The car was designed and built jointly by George S. Salzman and James M. Howe as the Howe-Salzman Co., and the proposition later laid before the Grant Brothers, of Detroit.

## FAVORS LOW DUTY ON CHEAP CARS

Washington, D. C., June 3—It is declared that Senator Stone's subcommittee, which considered the metal schedule, will report that motor cars costing not more than \$2,000 should be taxed 30 per cent ad valorem import duty instead of 45 as suggested by the Underwood bill. In the meeting of the full committee another amendment may be adopted to further decrease the tax on foreign cars costing less than \$1,500. All cars costing more than \$2,000 the subcommittee graded as luxuries and on them the 45 per cent rate will be retained. Cars worth \$2,000 or less the subcommittee classed as necessities.

## DISTRICT WILL STAND PAT

Washington, D. C., June 3—The district commissioners have served notice on Congressman Linthicum of Maryland that they do not intend to make any change in the regulations governing motor vehicles in the District of Columbia, against which Maryland motorists have been complaining.

## Obituary

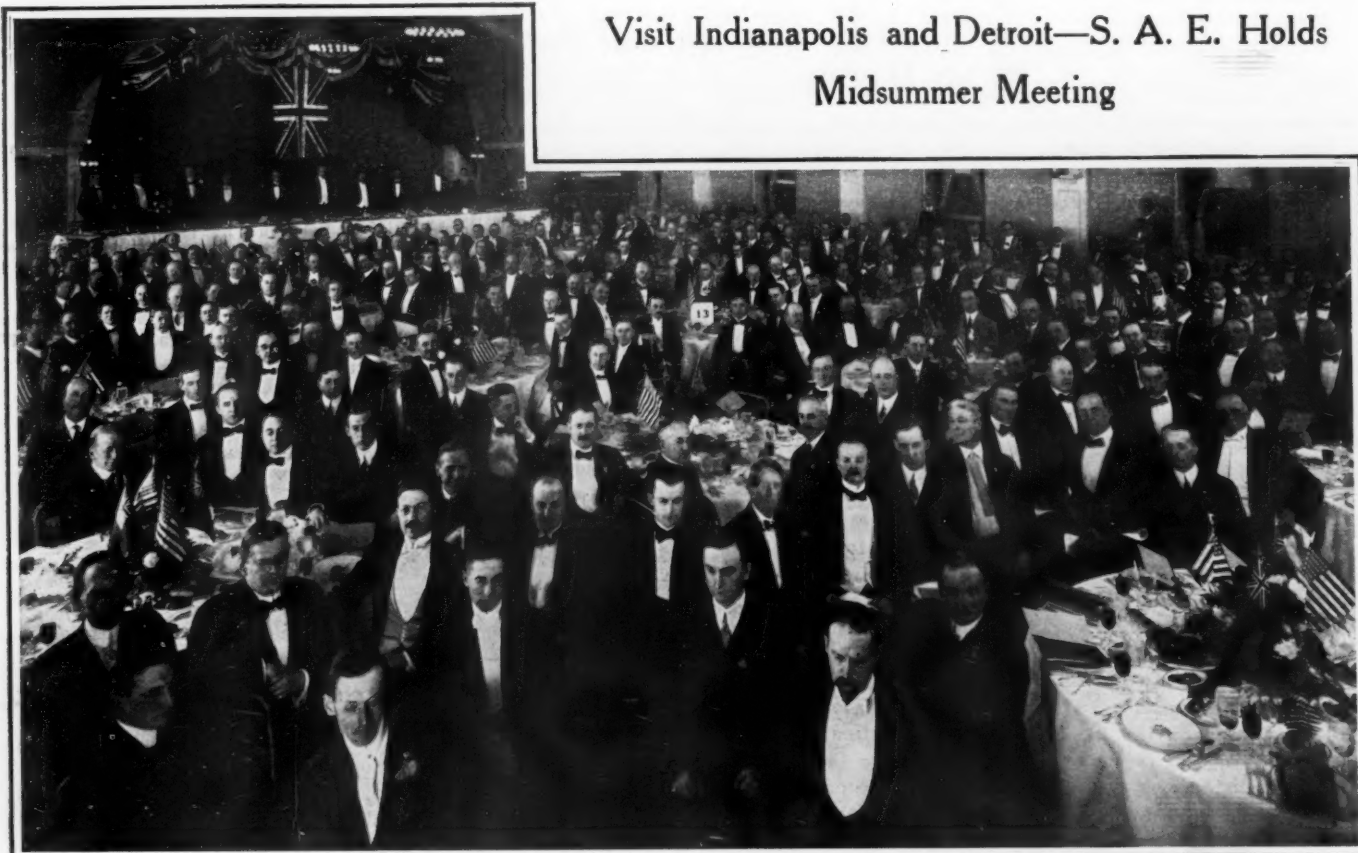
ALBERT AUGIER, general manager of the Paris Goodrich branch, died at his residence May 17, as the result of a self-inflicted revolver wound. The deceased appeared to be in normal health and no motive can be found for his act. About 6 years ago Albert Augier was put in charge of a French branch of the Goodrich. He was successful in building up an important business, and when the Goodrich company decided to form a French company and open a factory in the suburbs of Paris, M. Augier was left in charge of the French business.

HUBERT PRICE, general manager of the French Dunlop Tire Co., dropped dead in the streets of Paris from heart disease. He was an Englishman and 41 years of age.



# British Engineers Touring in West

Visit Indianapolis and Detroit—S. A. E. Holds  
Midsummer Meeting



BANQUET GIVEN IN DETROIT TUESDAY NIGHT, ATTENDED BY ENGLISH VISITORS AND SOCIETY OF AUTOMOBILE ENGINEERS

**D**ETROIT, Mich., June 3—The most successful banquet in the history of the S. A. E. was held tonight at the Ponchartrain. Seated at the tables were men of the greatest prominence in the industry both in this country and England. Howard Coffin acted as toastmaster at the banquet.

Howard Marmon, president of the Society of Automobile Engineers, made a short address on the welcome accorded to the visiting engineers of both countries by the city of Detroit. He thanked the city of Detroit for the freedom of the city and for the symbol given to the engineers of both bodies in the form of engraved parchment granting the courtesies of the greatest city of the industry.

#### Speech by President Browne, I. A. E.

T. B. Browne, president of the I. A. E., was introduced as one of the pioneers of the industry in Great Britain. In 1900 he was an active participant in the 1,000-mile test run given the old single-cylinder horizontal engine of that day. His speech was one of thanks for the hospitable welcome given the English visitors. Mr. Browne said:

You are the most hospitable nation in the world. I am impressed by the organization of the industry in your country, particularly as it is in Detroit. A perfect Niagara of cars streams forth from the factories here. We also are impressed by the beautiful city. Detroit reminds

Detroit, Mich., June 4—Special telegram—The party of American and English engineers to the number of 600 are just embarking for their session on the steamer City of Detroit, which will last 4 days.

This morning the program included a visit to the Continental, Hudson and Chalmers plants, at each of which the guests were welcomed by the officers of the company. The trip terminated at the Chalmers plant, where a luncheon was served and a quick return was made to the hotel and thence to the steamer.

The Englishmen have stood up gamey through the strenuous program and very few deserters from the ranks were noted in the tours through the plants.

us of Paris more than any other city we have been in. You have made enormous strides in the past 20 years and in a short time you will have nothing but motor cars here, all other industries being crowded out.

Fuel, of course, is a serious consideration with you as with us. It now costs 1 shilling 9 pence a gallon, but we may soon use kerosene, especially for the commercial vehicles, and we have hopes of being able soon to use a coal product. We admire the cars used in the work here, and we hope to emulate the standardization which you have worked out so well here, but which is apt to be much slower in England. We feel at home here, not as if we were in a foreign land. Your jokes appeal to us in spite of the story that an Englishman cannot see a joke.

Mr. Browne concluded with some appropriate words of thanks for the freedom of the city extended by the mayor and for the parchment proclaiming the same which was presented to the I. A. E. at the banquet.

#### Pullinger on Production

T. C. Pulinger, one of the England engineers, in speaking on the subject of production in a motor car factory said:

You must know your business, before you can be a success in it. What is needed most in a factory are men who will operate the machines as you want them to be operated. It is not a bit of good having a lot of engineers work machines in your factory, because it is most difficult thing to teach them how to operate them as they should be operated. They all think they know more than the factory manager. In Scotland I looked around for soldiers and sailors who were ready to go to work and I found them willing to learn what you want to teach them. At the present time these men are doing better work in their several operations than many of the educated men we have.

To make a motor car factory successful you must first of all get away from dead charges or what is known as non-productive labor as much as possible. Inspection departments are good, but it is better policy to teach your men to do accurate work. If you get your men to make the parts accurately you have accomplished one of the biggest things in the motor car shop. Try in this way to reduce your dead charges and you will reach eventual success in the industry.

H. M. Leland, president of the Cadillac Motor Car Co., gave what he characterized as a little shop talk. This was really a look into the future and it showed how the ideal car will have to be made under a combination of ideal production methods



by which all factors entering into the making of such a vehicle will be of the most efficient character.

Mr. Leland dealt with the ideal plant—that which might be and will be in operation at some distant time. He said the success of such a plant depends upon a combination of ideal conditions. He explained how this ideal car, which he said had not yet been produced, could be a success and be manufactured so that it successfully could pay dividends. It is made possible, by just two words—knowing how—just as it is necessary to know how to breathe before one can sing, so it is necessary to recognize all of the essentials of such production before it can be realized. That is a great art—the knowing how to make a motor car. It isn't being practiced in making cars today—in Detroit. Old-fashioned common sense is worth more than all of the modern cost keeping and efficiency methods today employed.

#### H. M. Leland Gives Advice

"Don't worry about your competitors," Mr. Leland told the engineers. "Show them the very best product which you are able to produce in your plant and tell them that if they can do better to do so for the good of all concerned. The motor car business is one of the greatest benefits of today and if we can in any way further its development we help all. If any one wants to go anywhere and get back he gets in a motor car and does it without the inconvenience of the steam cars or the other older methods of transportation."

There is a demand in the United States alone for 30,000,000 motor cars, said Mr. Leland, and China is awaking. This is the answer to the question often asked as to the ultimate destiny of the business. If you make a good car that sells itself, the public interest which is aroused by the advertising of all your competitors to the possibilities of motors in general, will buy your car. Let them create the demand and you give the public the car.

In conclusion Mr. Leland said that the more good motor cars which are made the better for all of the industry in general because the demand cannot be filled. One tour amidst the beauty spots without the handicaps of steam cars or boats is all

that is needed to make the 30,000,000 prospects firm believers that they want cars. This is the reason they ought to have them—only make them good ones.

## Visit Two Detroit Factories

### Englishmen Inspect Packard and Timken Axle Plants

**D**ETROIT, Mich., June 3—Today the program of instruction and entertainment for the visiting members of the I. A. E. and the S. A. E. included a trip in the forenoon through the plant of the Packard company and in the afternoon a visit of inspection to the Timken axle plant.

Leaving the hotel this morning the party soon was busily engaged in an interesting tour through the Packard factory. The works spread over an area of 37 acres. At the present time the factory is turning out twenty-one cars a day. Six of these are commercial cars and the remainder are divided among the different classes of passenger cars. A total yearly production of 3,000 cars is being made at the present time and of this number 1,800 are trucks.

The assembly room in the building especially set up for jobs peculiar to truck work was the first visited. Here the procedure of sending the chassis along the line was inverted. Instead groups of specialized workmen went from chassis to chassis, each group doing the particular work to which they were accustomed.

#### Packard Has Big Staff

The Packard company employs between 6,000 and 7,000 men and has a payroll amounting to \$20,000 a day. There are 350 employees in the administration department alone. The welfare of the men has been taken care of in an extensive manner and the work done in this line was especially interesting to the English guests. A washroom is located in every department and a lunchroom on the grounds has a capacity of 1,500.

The men work 52½ hours a week. There is a single shift in all but two of the machining departments, where it has been necessary to work nights to take

care of the extra output due to the introduction of commercial cars in the line. The men are paid every 2 weeks and work 2 weeks ahead of the pay day. They are paid on the 15th of the month for work up to the 1st.

It takes 72 hours for a motor to pass through the assembling department. Rotating racks are used so that it is easy to work on the bottom of the motor by simply turning it over. While the crankshafts are being assembled the shaft is turned over at 350 revolutions a minute by belt drive. This is done to assist in spotting the bearings before hand-scraping them to fit.

#### Watching Motor Tests

The testing of the motor provoked considerable comment on account of its rigidity before the road test. The motors are mounted on blocks and direct connection to dynamometers. The 38 motors are required to develop from 40 to 48 horsepower at 1,200 revolutions per minute, and the 48 motors must develop 60 horsepower at 1,200 revolutions per minute before they are allowed to go on the road test. Inspection tags are attached to the motors running on the blocks and the power developed at 1,200 revolutions per minute is indicated upon them. If they fail to come up to requirements they are sent back to the assembling department for overhauling.

The road test consists of a thorough run until the tester is satisfied with the behavior of the entire car. The test never is less than 4 hours and very often extends through a much longer time.

The testing work throughout the plant was of extreme interest and many of the groups lingered longest at work of this nature. Hydraulic tests on the water-jackets are made before the cylinders are passed along for assembling. A 30-pound pressure is put upon them in an endeavor to discover any faults in the casting which may have been disclosed by the finish grinding work that each casting is put through.

The men in the machine shops work on the premium system and in general the limits are generous enough on the work so that it is possible for the men to make



ENGLISHMEN AND MEMBERS OF SOCIETY OF AUTOMOBILE ENGINEERS AT FORD PLANT IN DETROIT



from full time and a quarter to time and a half. In cylinder-grinding work, for instance on the finish grind, time and a quarter is made on a fifty per hour limit.

After the trip through the factory was completed the party gathered at a luncheon tendered by H. B. Joy, the president, and other officers of the company.

#### Visit Timken Axle Plant

Shortly after the visitors again found themselves passing through another factory of absorbing interest, this time that of the Timken axle plant. Here over 175 tons of product are turned out in a day. This part of the plant is solely intended for the axle work. The Timken bearing factory is in Camden, O.

The factory in Detroit covers about 250,000 square feet of floor space.

In 1 day 130 sets of pleasure axles are manufactured and nine sets of commercial axles, making a total of about 280 axles a day.

Labor-saving devices are shown all over the factory. One good instance of this is the punching of the holes in the brake bands. This is done while the piece is straight. The machine at work while the visitors were passing through was punching forty-six holes at a time.

Other interesting pieces of machinery at which the English guests spent some time were the device for grinding the steering



1—The shoe race on the Minnewakka, which brought over the English engineers. Each woman removes a shoe and it was put in a sack with those of her competitors. The winner had to have her shoe on first

2—Women in I. A. E. party in race on steamer deck

3—Getting ready for women's race. The three at the right are Mesdames Wood, Brocne and Pollinger, wives of members of the party

4—Photography was one of the big features on shipboard

5—Smith, son of the manager of the Enfield Cycle Works, pushing his opponent out of the cock fight ring on the ocean liner

arm ball to a perfect sphere, the enormous shears for cutting the heavy stock, the gear-cutting machines and hobbors and the milling machine for grinding the spring-pads and axle faces at one operation lasting about 2 minutes.

The heat-treating work was also a great feature of the visit to those interested in forge work. In a small office the man in charge signals the condition of the furnace to the men tending the fires. Three lights are used, one above the other. A red is placed at the top, a white in the center and a green below. When the temperature is right the white is lit, when too high the red and when too low the green. A log is kept showing how the temperature of each furnace varied during each 10-minute interval of the day.

#### Monday Spent in Detroit Engineers Inspect Plants of Ford and Cadillac Companies

**D**ETROIT, Mich., June 2—English engineers, visiting Detroit, today inspected the Ford and Cadillac plants. At the former they saw for themselves just how Ford turns out 1,000 cars a day and also had a demonstration of American hustle when one of their party was presented with a car that was made while the visitors were passing through the plant. This occurred when George W. Houk, controller of the Rudge-Whitworth wire wheel interests in America, presented a full-fledged touring car to Secretary Basil H. Joy, of the visiting engineers. Mr. Houk has known Mr. Joy for years, having





lived 14 years abroad. Henry Souther, ex-president of the S. A. E., made the presentation speech. The presentation was a spur-of-the-moment affair, Mr. Houck purchasing the car a few minutes before it was presented.

Henry Ford personally piloted the party of 115 engineers through, having as his right-hand guest President Browne of the Institution of Automobile Engineers and on his left J. B. Dunlop, of Dublin, the inventor of the pneumatic tire. The procession first went to the final inspection department in the back yard of the plant, where each chassis is given its road test, amounting to scarcely 100 yards of driving necessary in order to get in line and pass between two inspectors who glance over the chassis, examine the production papers with it and pass it along to take its body. Today the chassis were passing one in every 20 seconds, or three a minute and 180 per hour. At this rate an 8-hour day should register 1,440 chassis.

#### Ford's Shipping Methods

The method of shipping Ford cars in knockdown condition in the freight cars was seen next. The chassis occupy one end of the car, the bodies and all other parts the opposite end. The wheels are off the chassis and they are placed at an angle of 45 degrees across the car. This permits of the closest packing possible.



Upper left-hand corner—1—A. L. McMurtry; 2—H. Massey Buist; 3—C. G. Moore; 4—C. T. F. Benson; 5—C. Wheeler; 6—T. B. Browne; 7—Henry Ford; 8—J. I. Ker; 9—R. W. Smith, Jr.; 10—H. Muckle; 11—R. W. Smith.

Upper right hand corner—Henry Souther, 12, presenting Ford car to Secretary Joy of I. A. E., 13.

Center, left—David Beecroft, 14; J. Inglis Ker, 15; A. L. McMurtry, 16.

Center, right—C. Whitney, 17; A. J. Slade, 18; H. C. Wilson, 19; E. R. Whitney, 20.

Lower illustration—H. M. Sweetland, one of the founders of the S. A. E. and two of the visiting engineers.

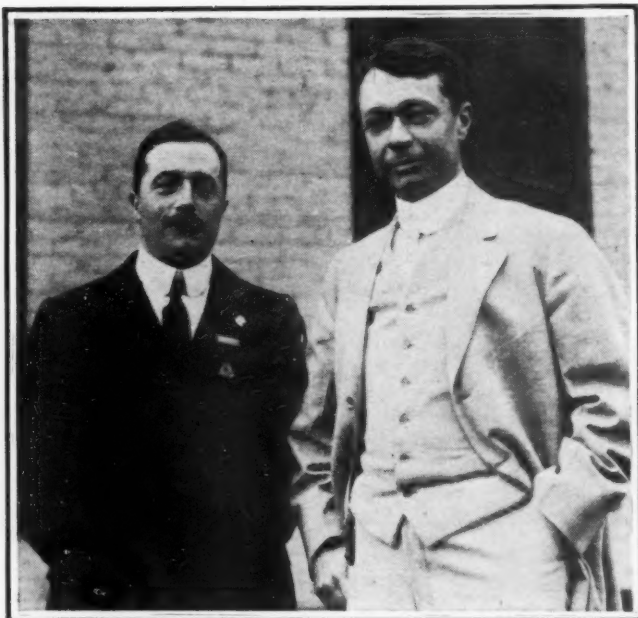
The production sheet for today showed that by 8 o'clock this morning 100 cars had passed through; by 9 o'clock 200 had been manufactured; at 10 the records showed 317 and an hour later 437 had been checked through. The daily output

ranges between 925 and 950 at present. A time ago a record was made, 1,117 cars being turned out in a single day.

The English and American engineers were alike interested in the multiple methods of production which have characterized Ford production since the inception of the present four-cylinder model. Interest at one minute centered in a multiple-drilling machine which makes forty-five holes at the same time.

#### Method of Piston Manufacture

What interested Basil H. Joy, secretary of the I. A. E. most was the method of piston manufacture, it being accomplished in about the same fashion that a lead pencil is sharpened by an automatic machine sharpener. The piston in the rough is mounted on a vertical spindle. Immediately it starts to revolve two cutters begin operations, one cutting the sides and the other the piston head, both being so timed that the operations are completed at practically the same second. Immediately they are done four other cutters begin, three cutting the grooves for the piston rings and the fourth the broad recess opposite the end of the wrist pin. The beveled edge of the piston head is accomplished by another cutter. While the stop watch was not held on the operation, it was but a slight pause in the procession to watch the entire job.



THE TWO PRESIDENTS—BROWNE OF THE I. A. E. AND MARMON OF THE S. A. E.

The fact that Henry Ford employs workmen by the day and week and has no one at piece work astonished all of the visitors. They imagined that piece work was the only possible method to be employed in a factory employing 16,000 workmen. Their excursion through the plant soon convinced them that Ford accomplishes results in other ways, in a word, that he is a general of men and so arranges much of the work that the pieces undergoing work pass in procession through the hands of perhaps six or a dozen workmen, so that if any one workman slackened the regular pace he would hold all of the others in the series back, the work would pile up around him, and the only consequence would be that he was not competent for the job. Ford has proven that he is right, and that results can be obtained without piece work.

T. Clarkson, manufacturer of steam omnibuses for the city of London, was an interested observer and student of Ford production. Mr. Clarkson was a visitor to America for the Chicago world's fair 20 years ago, when motoring was scarcely in its swaddling garments.

#### Visit to Cadillac Plant

The entire afternoon was spent by the party in making the rounds of the factory of the Cadillac. Here the visiting engineers were given an opportunity of seeing the American methods of manufacture which had been worked out in a plant which is working on an annual schedule of 15,000 cars.

The last 1913 car is scheduled to leave the factory of the Cadillac company at 5 p. m. of June 14. On that day the last of that model will have passed through the assembling plant and the entire manufacturing attention will be given over to the 1914 product. Eighteen thousand cars are scheduled for the coming season and material and accessories for that num-

ber of cars have been ordered. parties through the works many expressions of interest were heard from the English visitors. The elaborate system of gauging every piece of work by under and over limit gauges provoked general comment. The large machines designed for special work were also greatly admired.

One of the representative parties starting through the works started at one of the shops where some large milling operations were being carried out. In this department there was a large Ingersoll milling machine which faced off sixteen of the engine supporting arm faces at a time, eight on each side. This machine takes the place of four machines which formerly carried on this work.

Passing to the block testing room in which each of the engines are tested before they are mounted in the chassis, the full set of seventy-five engines were seen running on separate blocks. Each of the motors is given a thorough running test here under a moderate load of about 10 horsepower. The racks upon which the motors are carried are of special design and attracted the interest of the entire party.

#### Guide Rack Interesting

T. B. Browne, president of the Institute of Automobile Engineers, was particularly interested in the explanation of the guide of these racks. It is possible to turn the

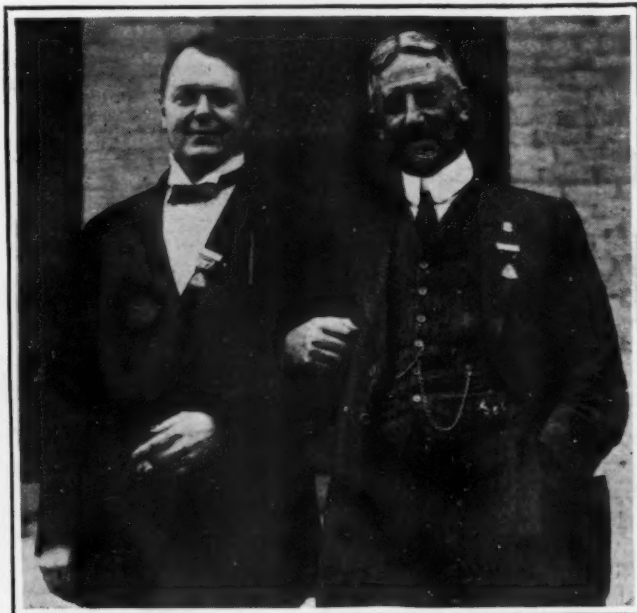
motor upside down in less than a minute and to adjust the bearings by simply removing the bottom of the crankcase.

In the bearing department a special feature of interest is the method used in placing the babbitt in the brass bearing caps. The babbitt metal has no affinity for brass. Solder, however, has an affinity for both brass and babbitt so that babbitt liners are put on after the brass bearings have been tinned. The solder forms a binding strip between the babbitt and the brass.

**Making Smaller Parts**

The manufacture of the smaller parts brought in some machinery which was new to the English guests as well as to many of the American visitors. In making the shackle bolts for the springs a revolving fixture is used which feeds to the cutters 3,500 bolts per day. A shackle bolt passes through the machine every 45 seconds.

The assembling work throughout the plant was examined with the greatest care. In the motor assembly department the crankshafts were set up and run by belt



THE TWO SECRETARIES—CLARKSON OF THE S. A. E. AND JOY OF THE I. A. E.

in their own bearings and then taken down and the bearings scraped by hand. The Cadillac car uses five main bearings which amount to a total of 95.75 square inches of bearing surface. All of this surface is gone over by hand, not a shim being used in the motor.

#### Assembling Connecting Rods

In assembling the connecting rods the lower bearing cap screws are very carefully made. This is an exceptional piece of work as the screws are first done in the rough to within .001 inch limit and are then sent through a special burnishing tool through which they must come within .0005 inch. The lower end of the connecting rod itself is ground to .001 inch and the exterior of the bearing bushing is ground within the same limit. This gives two



ground surfaces against each other in this bearing.

Before visiting the testing room of the plant in which all the chassis receive their work out instead of on the road, the party was conducted to the room in which they were originally assembled and there found a series of tables at which tea and bread and butter was served. At the close of this repast H. M. Leland presented each of the English visitors with a gold Cadillac fob.

#### Visit to Testing Room

The testing room proved of great interest. Twenty-two Sprague dynamometers were arranged along the longitudinal walls of the room. In each of these a chassis was passing through what corresponds to the road test.

The chassis is backed into place and a hydraulic jack lifts the rear wheels from the ground. In 10 minutes the wheels are connected by chains to the dynamometer and the entire driving mechanism is put through a 3½-hour test. During this time the car is run an hour at a speed of 30 miles an hour and 10 minutes on the lower speeds and reverse. Various speeds are tried and any noises which develop are carefully noted by the attendant who is in charge of two testing stands. The road test is entirely eliminated and a great saving results.

### Hoosiers Most Hospitable

#### Race and Factory Visits Interest Visitors at Indianapolis

INDIANAPOLIS, Ind., May 31—True Hoosier hospitality was shown the English engineers by the Indiana division of the S. A. E. during the 2 days spent in Indianapolis. The visitors did not have an idle moment from the time they reached

the city yesterday morning until they left at 9 o'clock tonight for Detroit. The 500-mile race at the speedway, of course, was the piece de resistance of the visit, but the hospitality did not end there. That used up yesterday, while today was devoted to visits to the Wheeler & Schebler and Prest-O-Lite plants and a ride through the country adjacent to Indianapolis with a so-called luncheon at the Indianapolis Canoe Club, which in reality was a noon-day banquet, finishing with a visit to Broad Ripple, where the visitors were treated to an old-fashioned clambake, which kept them busy until time to catch the train to Detroit.

The visitors were late in reaching the speedway yesterday, but as they marched into the paddock and took their seats in the special stand provided for them, which was located just north of the pits, they created quite a sensation. The hospitality of the speedway management was extended to them in the shape of refreshments, and the men from across the big pond spent the rest of the day pulling for the Sunbeam and expressing their admiration of the big track and the system that prevailed in handling the race.

#### Admire the Speedway

"It's a magnificent track, and we from England are much surprised at your enterprise," said one of the visitors, H. Massac Buist. "There's a vast difference, though, between it and Brooklands. At our speedway you cannot get the view of the race you can here. With us it is more in the nature of a road race, with the cars disappearing from view, while here one can watch them all the way around. I must say that I like this the better. Brooklands is faster—there is no doubt about that, but that's because of our high banking, where the cars can run to their limit. Here a car that has a powerful motor has

the best chance because of its acceleration powers. On these turns, where you have to shut down, it is necessary to be able to make a quick pickup of the speed after coming out of the turn."

The admiration of English for the 500-mile race was followed by the suggestion that possibly a similar race could be organized at Brooklands, although the Britons confessed that it would be impossible to get anything like the attendance Indianapolis had. It was suggested that possibly an international team race could be organized, with five cars representing each country. Some of the visitors

promised to take up the matter upon their return.

It was 10 o'clock this morning when the Englishmen started on the last lap of their Indianapolis visit. Climbing into cars at the Claypool, which were driven mostly by engineers from the Indianapolis factories, the first visit made was to the Wheeler & Schebler plant where the process of carbureter manufacture proved an interesting study. Each of the party was presented with a rose by President Frank H. Wheeler, while every department of the big plant was thrown open for inspection of the visitors.

Following this the visitors were whirled to the Prest-O-Lite plant at Speedway, the new horseless town. This plant, just opened, kept everyone going for more than an hour. The Britons, who rely mostly on acetylene lighting by generators, marveled at the utility and simplicity of the Prest-O-Lite tank system, and absorbed every word of information given out by the company's employees. A demonstration of the new starter was made, which also enthused the visitors, who know comparatively little of self-starters but who seemed anxious to learn more about them.

Next a jump was made to the Indianapolis Canoe Club, also just opened, where the visitors had a chance to see what country club life was like. It was an oppressively hot day and the cool porches were most inviting. The luncheon tables were spread on one of the porches overlooking the river and a most elaborate meal was served, which was followed by several speeches. Howard Marmon, president of the Society of Automobile Engineers, presided as toastmaster and called on H. O. Smith, president of the Premier company for the first remarks. In a most graceful speech which breathed the hospitality of America and the admiration of the Americans for the English engineers, Mr. Smith extended the glad hand. Replying, President T. B. Browne, of the I. A. E., spoke wittily, while C. A. Bookwalter, former mayor of Indianapolis, made the address of welcome on the part of the municipality, showing a familiarity with the motor industry that impressed his hearers.

#### Barbecue at Broad Ripple

Leaving the club at 4 o'clock the engineers next were treated to a 10-mile drive through the country adjacent to Indianapolis to Broad Ripple, the scene of the clambake. It was a novel experience, that clambake, and although the party had just got up from the table, still everyone was able to make inroads into the repast, which consisted of chicken, lobster, fish and clams.

Prominent in the entertaining were several of the Indianapolis engineers—Wall, of the National; Weidley, of the Premier; Crawford, of the Cole; Howard Marmon and George T. Briggs, of Wheeler & Schebler. The party of visitors lingered to the last minute, then took the train for Detroit and more sight-seeing.



J. B. DUNLOP, INVENTOR OF PNEUMATIC TIRE, AND  
T. B. CLARKSON, ENGLISH VISITORS

## BOOM NATIONAL RUN

### Gophers Report Several Additions to Entry List for Contest

## TWO TEAMS DECLARED

### Boston and Minneapolis Will Be Represented on Tour

## DULUTH TO GIVE SUPPORT

**M**INNEAPOLIS, Minn., June 2—Both Boston and Minneapolis have entered teams for the national reliability tour of the American Automobile Association, July 11-19, Minneapolis to Glacier Park Station, Mont. The Boston team is made up of three Metz cars and the Minneapolis team of three Krit cars. The latter is by representatives of the Northwestern Automobile Co. and the former by George H. Voter, C. H. Metz and C. Walker. Louis W. Hill, chairman of the Great Northern road, has made an entry of a Packard car. C. D. Bertolet, 1110 Boyce building, Chicago, promises to enter a Speedwell carrying a group of advertising men. Duluth is to enter one or more teams.

Inquiries received by Chairman C. E. Dutton, Pillsbury building, indicate that there is to be a heavy Northwestern entry especially from clubs in the Minnesota State Automobile Association. A new folder giving full details of the trip preparations and of the excursion trips possible at the end of the run is to be out late this week. This folder is being prepared by Asa Paine, chairman of publicity. At a meeting last week a sub-committee to the national touring board was appointed to finish up the entries. They are: Dr. H. F. Marston, Harry Merriman, C. A. Stedman, G. Roy Hill, W. S. McCarty.

### SIXTEEN ENTRIES FOR TACOMA

Tacoma, Wash., May 31—With sixteen entries already listed and others promised, including Teddy Tetzlaff, Bob Burman and in all probability Barney Oldfield, the 3½-mile course being given constant oiling and rolling to put it in excellent trim, Tacoma's road races for 1913 promise to furnish the opportunity for breaking of records. That the \$10,500 in prizes offered, including the \$5,500 prize for the Montamarathon, will be hotly contested for, goes without saying while the total number of cars that probably will face the starter in the various events will doubtless be greatly increased through the efforts of road race agents now at Indianapolis and elsewhere. The complete list of entries to date, day and hour of race, is as follows:

Saturday, 10:30 a. m., July 5—Inter-City Century for cars from Washington, Oregon, Idaho, Montana, British Columbia or Alberta, car entered to have been operated at least 60 days; prize \$1,500 and perpetual challenge trophy presented by Tacoma Automobile Club.

The entries: E. J. Cameron, Victoria, B. C.; driver, himself, Stutz; C. H. Hooper, Vancouver, B. C., driver, himself, Simplex; M. MacLeod, Vancouver, B. C., driver, himself, American; Frank A. Tauscher, Portland, Ore., driver, himself, Cole; W. L. Alfred, Tacoma, driver, Nickels, Apperson; H. M. Prince, Tacoma, driver, not named, Reo; Stutz Motor Car Co., Seattle, Stutz.

Saturday, 2 p. m., July 5—Golden Potlatch trophy, 200 miles, cars of 600 cubic inches displacement; prize \$3,500 and perpetual challenge trophy presented by Seattle Carnival association. The entries: Charles M. Thomsen, Seattle, driver, Bill Taaffe, National; C. L. Jack Welch, Seattle, driver, himself, Locomobile; Stutz Motor Car Co., Seattle, Stutz; E. E. Hewlett, Los Angeles, driver, Tetzlaff, Fiat; Earl Cooper, Los Angeles, driver, himself, Stutz; Walter Hempel, San Francisco, driver, Barney Oldfield, Mercer.

Sunday, 2 p. m., July 6—Montamarathon trophy, 250 miles, open to any gasoline car; prize \$5,500 and a perpetual challenge trophy presented by Tacoma Carnival association. The entries: Charles M. Thomsen, Seattle, driver, Bill Taaffe, National; C. L. Jack Welch, Seattle, driver, himself, Locomobile; Stutz Motor Car Co., Seattle, driver, unnamed, Stutz; E. E. Hewlett, Los Angeles, driver, Tetzlaff, Fiat; E. E. Hewlett, Los Angeles, driver, Felix Magone, Fiat; E. A. Moross, Indianapolis, driver, Bob Burman, Benz; E. A. Moross, Indianapolis, driver, Carlsen, Benz; Earl Cooper, Los Angeles, driver, himself, Stutz; Walter Hempel, San Francisco, driver, Barney Oldfield, Mercer.

Oldfield's formal entry has not yet been received, but a letter just at hand from him indicates his intention to participate in the Tacoma races.

The course is now in first-class condition and will be open for practice shortly.

### IOWA TO HAVE BIG TOUR

Des Moines, Ia., June 1—Iowa's most important motor event, the annual little Glidden tour, this year will be the longest that has been attempted in Iowa. It will cover a total of 1,031 miles, touching some of the prominent cities in the state. The tour will be conducted, as usual, under the official sanction of the American Automobile Association, with which the Iowa association is affiliated. A. A. A. rules and regulations will be followed in conducting the event.

J. E. Robison, the official pathfinder for the tour, has started to map out the route and reports are that roads are in fairly good condition and unless rain spoils the plans of the pathfinder, the trip will be put through on scheduled time.

Mr. Robison will follow a general route that has been approved by the executive committee of the state association. It is a 6 days' run and the pathfinder will make the trip on scheduled time. On the first day it is proposed to travel from Des Moines to Keokuk, a distance of 209 miles, making Ottumwa the noon control. The towns included are: Indianola, Knoxville, Oskaloosa, Ottumwa, Mount Pleasant and Keokuk.

As several hours will be spent Tuesday inspecting the new dam across the river at Keokuk, an easy run of 123.9 miles from Keokuk to Davenport is planned for the second day. The noon stop will be at Burlington. The towns on the route are: Fort Madison, Burlington, Mediapolis, Muscatine and Davenport. On the third day the tourists will travel from Davenport, stopping at Cedar Rapids for the noon control, to Waterloo, the night stop.

On the fourth day's schedule is a run of

181.3 miles from Waterloo to Fort Dodge, with the noon control at Mason City. The night control will be established at Fort Dodge. On the fifth day the contestants will travel from Fort Dodge to Sioux City, a distance of 161 miles. The noon control will be at Storm Lake and the night stop will be made at Sioux City. The sixth day's trip will be a long grind from Sioux City to Des Moines, a distance of 212 miles.

It is expected that thirty-five cars will be entered and that a great many owners will enter cars.

### COAST ROAD RACE ENTRIES

Los Angeles, Cal., May 31—Twenty-four entries have been received to date for the Los Angeles-San Francisco road race, scheduled for July 4. The list is as follows:

No.	Car.	Driver.
1.	Cadillac	S. A. McKee
2.	Cadillac	A. G. Faulkner
3.	Simplex	Wm. F. Bromlette
4.	Apperson	Omar Toft
5.	Simplex	H. J. Pink
6.	Cole	Barney Oldfield
7.	Mercer	T. J. Beaudet
8.	Fiat	Gaston Morris
9.	Cadillac	P. E. Leach
10.	Mercer	H. J. Raymond
11.	Macomber	Thos. McKelvy
12.	Mercer	G. E. Ruckstell
13.	Locomobile	Louis Nickrent
14.	Overland	E. Roger Stearns & O. W. Kern
15.	Mercer	D. Kapuczin
16.	Touraine	Geo. Cassin & C. V. Cox
17.	Simplex	
18.	Buick	
19.	National	
20.	Kissell	
21.	National	
22.	Winton	
23.	Moon	
24.	National	

### C. M. C. WINS TEAM MATCH

Chicago, June 2—The Chicago Motor Club defeated the Illinois Athletic Club in an interclub team match to Indianapolis and return by 149 points. The affair was robbed of interest by the fact that the contestants were allowed to use their cars the day they spent in Indianapolis attending the 500-mile race, nine of the entrants failing to check in for the return journey.

### ITALIAN ENGINEER KILLED

Paris, May 23—While training for the French grand prix, Guido Bigio, chief engineer of the Itala company, and his mechanic, Giovannini Abrizzon, were killed in the neighborhood of Dieppe yesterday morning. Bigio, who had been connected with the Itala factory at Turin for about 7 years, and was somewhat recently appointed technical director, was tuning up the cars specially built for the French grand prix race next July. The exact cause of the accident is not known. An hour and a half after the start a reserve car went round the course and found the racer overturned, with the four wheels uppermost. Bigio was driving one of the rotary valve Itala racers having a four-cylinder motor with a bore and stroke of 125 by 170 millimeters. The three cars were to be driven in the French grand prix by Nazzaro, Moriendo and Bigio. The un-



fortunate engineer had not previously taken part in any important race, but had figured in a number of local contests in Italy and was looked upon as a clever driver.

#### CORONA FRAMES RACE PROGRAM

Los Angeles, Cal., May 30—The definite program for the \$10,000 Corona speedway races September 9 has been announced by the directors. The 3-mile circular track, 70 feet from curb to curb, will be completed by July 1. This boulevard runs around the city of Corona. The first race is for cars of 230 cubic inches and under, 100 miles. Prize money will be divided: \$1,000, \$500, \$250 and \$100. A free-for-all, 300-mile race will also be run and cash prizes of \$3,000, \$2,000, \$1,000, \$800 and \$330 hung up. The entry list will open June 21 in charge of F. H. Ott, president of the board of directors.

#### GEORGIA BOASTS MANY CARS

Savannah, Ga., May 31—Georgia has nearly twice as many motor cars as any other southern state. A comparative statement, showing the total registration to May 1, gives Georgia 20,078 motor vehicles, which is not far from double the number in Tennessee, with 11,225, while Florida runs third with 9,978.

The figures for Georgia today would be above 20,200, as the secretary of state is now issuing licenses at the rate of from 300 to 400 a month. The comparative registration in these states up to May 1 for this year, and also for the same date last year, is as follows:

Georgia—this year, 20,078; last year, 14,000.  
Tennessee—this year, 11,225; last year, 7,181.  
Alabama—this year, 9,978; last year, 4,896.  
Florida—this year, 4,350; last year, 3,360.  
Arkansas—this year, 4,500; last year, 3,360.  
North Carolina—this year, 7,000; last year, 4,000.  
Virginia—this year, 6,094; last year, 4,020.  
Mississippi—this year, 3,079; last year, 2,000.  
Kentucky—this year, 7,500, estimated; last year, 4,000.

Two other southern states, South Carolina and Texas, require county registration, and in Louisiana each county or township does its own regulating. Georgia last year had twice as many cars as any other southern state, and this year's statement shows that it has kept up its record.

The last government report shows that Georgia leads all the other southern states in the number of miles of good roads built, and is second in this respect in the United States, being exceeded only by the state of New York.

#### FRENCH ARMY TRIAL DATES SET

Paris, May 23—Instead of a series of trips around Versailles, the ninety-eight commercial vehicles entered for this year's French trials will be sent on a journey across France, with Lyons and Bordeaux as the extreme points. This competition, which is almost exclusively a military event, is organized with a view to testing the endurance of the trucks in the military subsidies. If a vehicle accomplishes the tests in a successful manner, the manu-

facturer has the advantage of selling all duplicates of this model as army subsidized types, the purchaser receiving an annual subsidy and entering into an agreement to hand over the truck to the military authorities in case of mobilization.

This year's trials will last from July 1 to August 12. The first 3 days will be occupied in weighing and sealing the vehicles at Versailles. From July 5 to 12 a series of runs will be made around Versailles, the daily distance being from 60 to 90 miles, the fuel being gasoline. On July 16, 17, 18, 19 and 20, town-to-town runs will be made, under full load, with carbureted alcohol used as fuel.

After a rest at Dijon the competing machines will continue to Lyons, Montbrison, Clermont-Ferrand, Limoges, Perigueux and Bordeaux, carrying full load and using benzol. A day's rest will be allowed at Bordeaux, the return to Versailles being made in five stages, through Angouleme, Poitiers, Tours and Chateaudun, using gasoline as fuel. August 8 and 9 will be rest days, and the 3 following days will be occupied in dismantling the various organs of the machines in order to judge the amount of wear that has taken place.

The firms entered in the trials are the following: Delahaye, Panhard-Levassor, Balachowsky & Caire, de Dion-Bouton, Rochet-Schneider, Berliet, Motobloc, Delaunay & Clayette, Sauer, Brasier, La Buire, Peugeot, Clement-Bayard, Lorraine-Dietrich, Latil, Aries, Cohendet and Cottin & Desgouttes.

#### NEW YORK TAXICAB FARES REDUCED

New York, June 2—The Grimm ordinance abolishing private stands for taxicabs in New York city and the leasing of the streets in front of hotels by the proprietors of the latter and reducing the rates for taxicab service was passed last week by the board of aldermen's vote of 65 to 1. Instead of the present rate of 80 cents for the first mile and 50 for additional mile, the schedule puts the first mile at 50 cents and each additional at 40 cents, for one or two passengers, while for more passengers the first mile is 70 and each additional 60 cents.

#### HOUSE NAMES ROAD COMMITTEE

Washington, D. C., June 2—Recognizing the great question of good roads, the democratic caucus of the house of representatives has created a committee on roads with Representative Dorsey Shackleford of Missouri as chairman. The other members of the committee are as follows: Edward W. Saunders, Virginia; Henry A. Barnhart, Indiana; James S. Davenport, Oklahoma; James F. Byrnes, South Carolina; Hubert D. Stephens, Mississippi; John J. Whitacre, Ohio; Robert L. Doughton, North Carolina; John R. Connelly, Kansas; Edward Keating, Colorado; Clyde H. Tavenner, Illinois; Jeter G. Teneyck, New York; James B. Aswell, Louisiana; Frank L. Dershem, Pennsylvania.

## FAST TIME BY ARGYLL

### British Car Smashes 14-Hour Record at Brooklands

### DOES 1015 MILES, 437 YARDS

#### Single-Sleeve Motor and Worm Drive Part of Equipment

#### EDGE'S OLD MARK BEATEN

CHICAGO, June 2—Mail advices from England tell of the record-breaking performances of an Argyle, fitted with a single-sleeve valve engine and parallel worm drive on the Brooklands speedway May 19, when the car, driven by W. H. Scott and L. C. Hornsted, did 1,016 miles 437 yards in 14 hours. A week later, as reported in the last issue of Motor Age, this same combination created a new 12-hour record of 914 miles 640 yards. In the drive on May 19 the Argyll smashed S. F. Edge's mark of 938 miles 480 yards, made in a Napier in 1907. The Argyll's times were as follows:

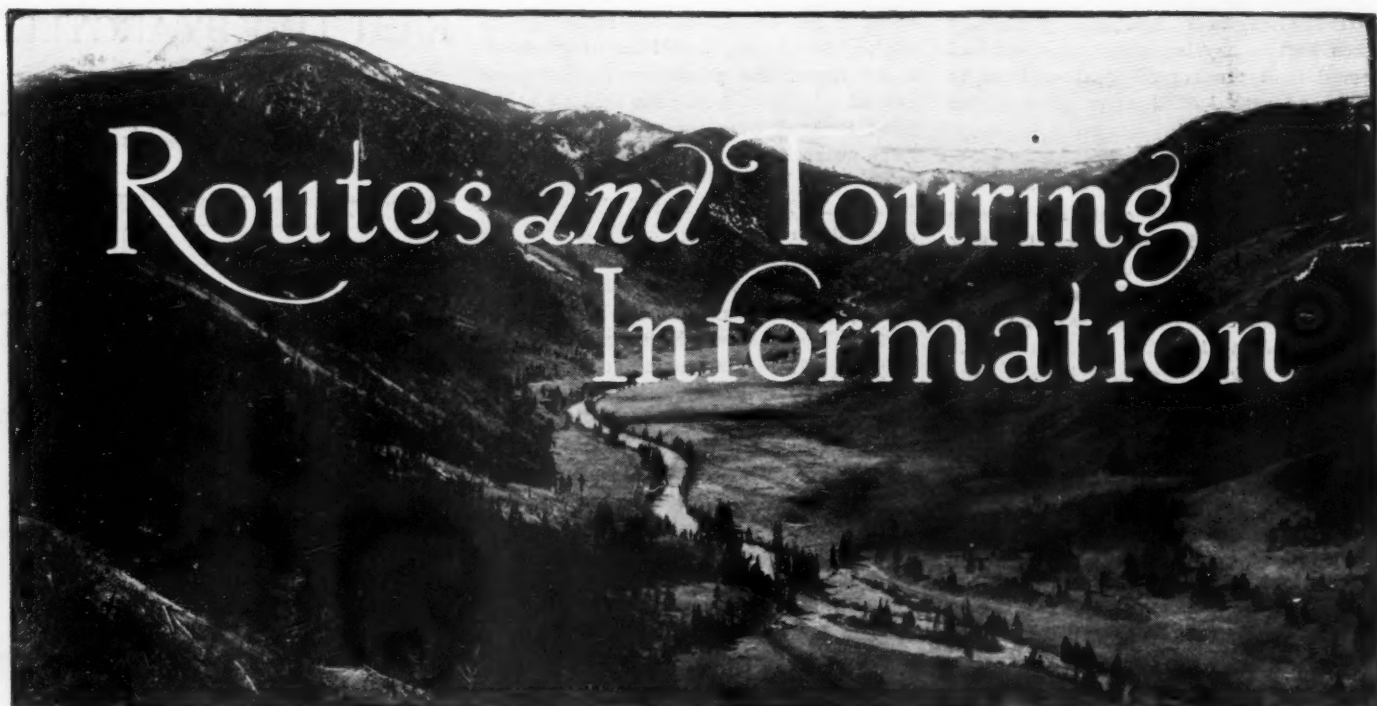
Miles	Time	M.P.H.	
50	41:11.62	72.83	
100	1:22:09.58	73.03	
150	2:03:04.35	73.13	
200	2:43:47.03	73.27	
300	4:09:09.33	72.24	
400	5:29:11.38	72.91	
500	6:53:46.95	72.5	
600	8:18:29.7	72.22	
700	9:38:23.87	72.6	
800	11:00:24.33	72.69	
900	12:23:44.6	72.61	
1,000	13:47:05.43	72.54	
Hour	Miles	Yards	M.P.H.
1	72	1,326	72.75
2	146	524	73.15
3	220	49	73.34
4	288	298	72.04
5	363	1,191	72.74
6	436	1,196	72.78
7	508	429	72.6
8	581	394	72.65
9	652	804	72.49
10	726	1,702	72.7
11	799	1,000	72.68
12	870	1,679	72.55
13	945	360	72.71
14	1,016	437	72.59

Two stops were made to change tires; another stop was occasioned by an air leak in the gasoline line, while at regular intervals drivers were changed. The system of signaling the drivers was most complete and the trial went off without a hitch.

The Argyll had a four-cylinder motor of 3.14 inches bore and 5.11 inches stroke. Bosch ignition was used and the carbureter was a Zenith. The gear ratio was 3.25 to 1 and the wheels were 32.28 inches, detachable, and fitted with Dunlop tires.

#### RACING PLANS PROGRESSING

Philadelphia, Pa., May 30—By a decision of the committee on superintendence of the Fairmount Park commission, that body will recommend to the commission that favorable action be taken on the Quaker City Motor Club's petition to renew the road races in Fairmount park. The proposition will be put up to the commissioners at their next meeting on Wednesday, June 11. In all probability a fall date will be chosen.



ON THE WAY TO YELLOWSTONE—THE GALLATIN BASIN AND MOTOR ROAD

## To Wonderland by Motor Car—to Yellowstone Park

TO the outdoor nature-lover, the nation's wonderland, the Yellowstone national park always has been the favored playground; to the redblooded motorist man or woman a run from the middle west over good roads through Montana, "The Land of the Shining Mountains," as the Indians named it, to the Yellowstone national park means thrills in anticipation and delight in realization.

Little more than a century ago the first white men of this nation passed across the Dakota plains, traced the Missouri river to its three forks near the national park, and later passed down along the Yellowstone river over the route where the big touring car now hums, back to the Missouri. Historic ground, every foot of it, is covered by the motor party that takes the best and most delightful jaunt of them all—west over the Dakota prairies, through picturesque bad lands, along the turbulent Yellowstone with its wide green valley bordered by shining mountains, to Yellowstone national park.

### Ideal Tour Outlined

Motoring from Minneapolis and St. Paul west through South Dakota, North Dakota and Montana affords an ideal trip of a week or better yet, of 10 days, for Montana is full of side trips which it were a crime to miss. The journey is a rising scale of surprise and enjoyment, reaching its glorious climax in Montana in and about the Yellowstone park. Continued work on the roads along the route shown in the accompanying map resulted in real motor roads, leading over the golden Dakota prairies, through rainbow-hued bad lands, across green and fertile valleys, and

By Chester C. Davis

through shaggy mountain passes under the shadow of immense white-capped peaks, to the goal.

The wonderful scenery will be conceded without question; the motorist who is contemplating a journey to the park, asks first about the roads, then about weather and climate. Inquiries from motorists in

the east and middle west as to the accessibility of Montana and the park in motor cars led the Gallatin Automobile club to prepare a map showing the route taken by Dr. H. L. Galbraith and Dr. W. H. South and their families to the Twin Cities and return from Bozeman, Montana, in the summer of 1912.

But 2 days of rainy weather were encountered by this party on their round trip of approximately 2,400 miles. Mostly the roads were excellent; they never were impassable or extremely bad. Such was the ease with which the run was made that the two women in the party and the 3 and 4-year-old children of Dr. and Mrs. Galbraith experienced no hardship but rather continued pleasure on the trip. Seven days are ample for the jaunt but to accomplish it in this time the party must of necessity forego many of the delightful side excursions in Montana as the park is neared.

### Accommodations Plentiful

Garages and repair shops are plentiful. Every cross-roads town in South Dakota has its garage, while the run through Montana along the Yellowstone river is dotted with hamlets and cities with every convenience. Accommodations at hotels or, if preferred, with some hospitable rancher are surprisingly good, and the glad hand of welcome is stretched out everywhere to make the run delightful.

Leaving St. Paul the motorist should direct his course almost due west through Granite Falls to Watertown, S. D. At the start of the tour the car will bowl rapidly along over roads as smooth as a table. The Bozeman party ran from the Twin



CORWIN'S HOT SPRINGS, SEEN ACROSS UPPER YELLOWSTONE



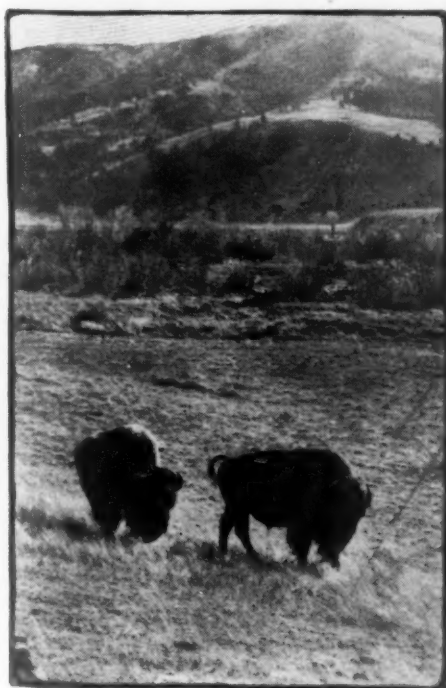
Cities to Clark, S. D., about 250 miles, in the first day. Some of the most fertile fields of the Dakotas are found in the run along from Watertown to Redfield and from Redfield on the 30-mile jog northward to Aberdeen, the Hub City of South Dakota, where the route turns westward again for the long spin across sunlit prairies.

Rapid progress is made across the face of what the residents love to call the Sunshine state. The second day's journey will end with the tourist party on the banks of the big Missouri at Mobridge. Here the watches are set back, for the travelers pass from central to mountain time. In the morning the party will be taken across the river on a ferry.

#### Indians in Evidence

The road through the Standing Rock Indian reservation paints many vivid pictures on the mind of the tourist. Here at first hand the copper-skinned native son and daughter can be seen learning the ways of the white man. Not through villages of skin tepees but through clusters of frame houses in which the Indian farmer and his family dwell, the road winds westward and northward, crossing over into North Dakota at Lemmon, S. D. The afternoon's run through the southwest corner of North Dakota leads past Hettinger, Bowman, Rhome and Mouth, and the third night finds the travelers in Montana.

The run from Ismay to Miles City will be ample for one day, and the traveler begins to realize the immensity of Montana when he learns that Custer county, the great empire in the eastern part of the state, is larger than many of the states of the union. Between Ismay and Miles City some picturesque mountain scenery lies on the right—rainbow colors that defy pigments with their gradations of red, yellow,



SOME BUFFALO SURVIVE



BIRDSEYE VIEW OF GARDINER, GATEWAY TO PARK

blue, white and brown. Here also are the last of the great herds of cattle that made Miles City one of the final stands of the big stock man and the cow puncher.

At Miles City the travelers get their first glimpse of the Yellowstone river—swift, treacherous and yellow-hued. From this point to Livingston, the tourist follows the trail made by Captain Clark of the Lewis and Clark expedition in 1806. A smooth road parallels the Yellowstone river between the great ranges of hills, sometimes through the green alfalfa in the valley or again through the great grain fields on the benches.

A marked difference in the stream itself appears at the juncture of the Big Horn with the Yellowstone. Below it is yellow and turbid; above it is blue.

At Custer on this junction, a magnificent motor road leads to the Custer battleground where on June 25 and 26, 1876, General Custer and his little band of 250 men held at bay 5,000 Indians and perished to a man. The graves of the soldiers are marked, clustering about the Custer monument which indicates the spot where the intrepid Indian fighter fell. The battleground is but 32 miles from the main road.

#### "Heart of the Yellowstone"

Shortly after leaving Billings, the "Heart of the Yellowstone," on the last day's run of the tour, the first of the wonderful trout fishing that helps make Montana an earthly paradise for the hunter and fisher, is to be had. A well-kept motor road leads up Boulder canyon from just below Big Timber, for 30 miles to the great natural bridge of solid rock that spans the dashing mountain stream. A few casts here in the Boulder will supply the party with the trout for a camp dinner.

At Springdale just before Livingston is reached, the road branches off for 2 miles to one of the famous hot springs resorts of Montana—Hunter's Hot Springs. Here at the Dakota hotel is the huge plunge,

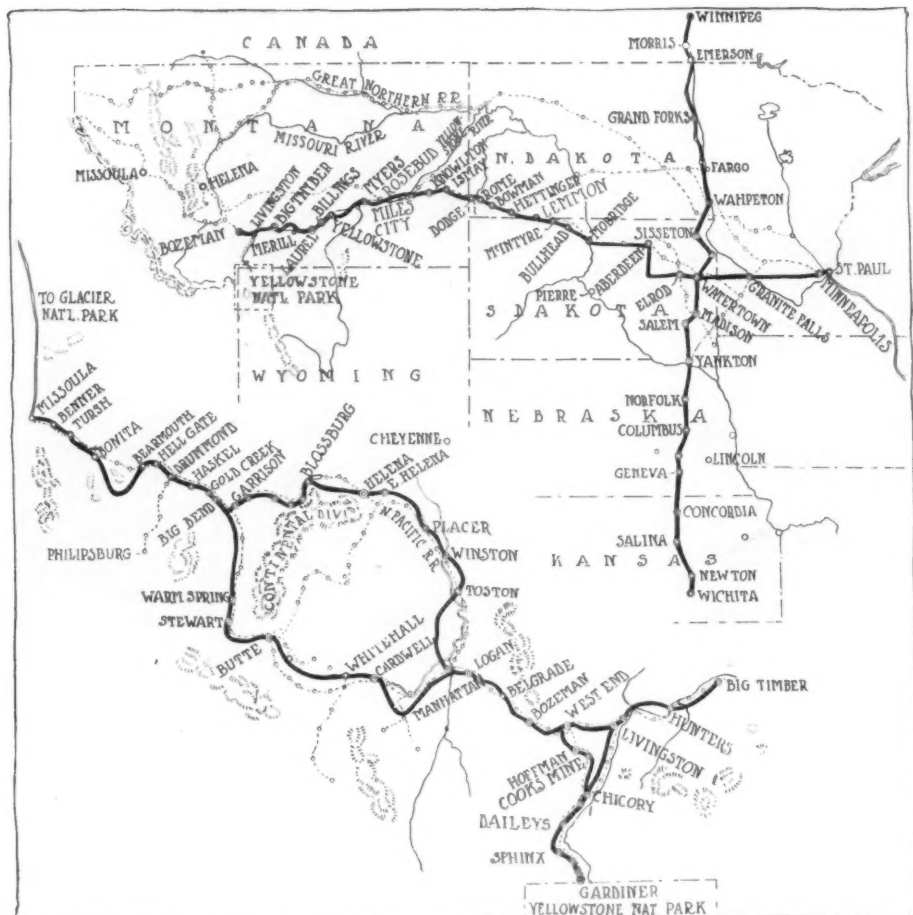
filled with the steaming curative waters that bubble up all about the grounds. The next stop will be Livingston, or the tourists can drive for 25 miles through Rocky canyon, lined with the prettiest mountain scenery yet encountered, to Bozeman, nestling among the mountains in the famed Gallatin valley.

#### Two Montana Entrances

As there are two Montana entrances to Yellowstone park, so are there two roads to reach them. From Livingston to Gardiner, the eastern entrance, is a beautiful trip of 60 miles. At one time this road was a terror to motorists but in the past two seasons convict labor has been employed road-building, and even the once formidable Yankee Jim hill now is surmounted by easy grades on a firm rock



GROUP OF ELK IN PARK



OUTLINE OF ROUTE BETWEEN ST. PAUL AND YELLOWSTONE PARK

road-bed. No matter how much rain falls here this road, with its rock foundation, is always good. Corwin's Hot Springs are encountered just before reaching Gardiner, the gateway to the park, and here are ample and comfortable hotel facilities for the tourists.

The other route leads from Bozeman up the West Gallatin canyon to Yellowstone, the western entrance of the park. This

takes the tourist through 80 miles of scenery that rivals the park itself. Because the road passes for 17 miles within the park boundary, it has been closed to motor cars in the past, but the proposal to open it is now before Secretary Lane of the department of the interior, and there is little question but that it will open before tourists begin to reach the park by motor car.

## Answers to Many Route Inquiries

### Ponca City, Okla.-Kokomo, Ind.

**PONCA CITY, Okla.**—Editor Motor Age—Kindly give through Motor Age the route from Ponca City, Okla., to Kokomo, Ind., via Wichita, Newton, Kan., and Kansas City, Mo., and Indianapolis, Ind. Also advise where I can purchase a blue print drawing showing the route, the same as described in the Blue Book, as I do not want to carry such a large volume with me. I understand there is some firm which furnishes blue prints and descriptions of different routes. I would like to know the cost of such prints. I would also like to know if it would be more desirable to go by the way of Newton, Kan., north until one strikes the Waubonsia trail crossing the river at Keokuk, Ia., and going by way of Springfield, Ill. I am figuring on making a trip starting on June 15. Which would be the most desirable route?—F. D. Applegate.

Following the stone road north to Wichita, through Newkirk, Arkansas City, Winfield, Mulvane and Derby you will there strike the Meridan road which will take you to Newton, Kan. At this point turning east you will traverse the Santa Fe trail via

Peabody, Florence, Clements, Elmdale, Cottonwood Falls, Emporia, Waverly, Williamsburg, Ottawa, Edgerton, Olathe, and Martin City to Kansas City. As the road between this point and St. Louis has some bad stretches which are fairly impassable in wet weather, your best route will be to proceed north from Kansas City through Leavenworth, Lowemont, Atchison to St. Joseph; thence by way of Rochester, Stanberry, Grant City, Redding to Mt. Ayr.

The Waubonsia trail will now lead you through Kellerton, Leon, Corydon, Jerome, Centerville, Moulton, Pulaski, Mt. Sterling, Farmington and Donnellson to Fort Madison where you will cross the Mississippi river and proceed to LaHarpe, Good Hope, Bushnell, Ellisville, Farmington to Peoria. From Peoria you will reach Tremont, Danvers, Bloomington, pass just north of Gibson City, through Hoopeson, Talbot, Oxford, Montmorenci, LaFayette and Middlefork to Kokomo.

Regarding blue prints of routes outlined, Motor Age does not know of anyone who furnishes anything of the sort. If anyone reading this communication knows the name

and address of anyone furnishing such blue prints it would be appreciated if they would send same to this office.

The Blue Books covering the route outlined are No. 5 for the section west of the Mississippi river and No. 4 for the eastern portion of the journey.

### Viola, Wis.-Marion, Kan.

**Viola, Wis.**—Editor Motor Age—Please give me the best route to Marion, Kan., routing through Richland or Viroqua, as I live between the two places. Also give the mileage. I would like to start June 20.—W. Gribble.

Via Viroqua will be your more direct route, thence through Rising Sun, Mr. Sterling, Eastman and Prairie du Chien, a distance of 58 miles. About a half a mile beyond Prairie du Chien you will cross the Mississippi river by ferry which makes five trips a day. It is well to make an arrangement in advance for ferryage. Going west through McGregor, Mona, Postville, Clermont, West Union, Hawkeye, Williamstown, Charles City, Rudd and Nora Springs the run from Prairie du Chien to Mason City is one of 125 miles over a regularly dragged dirt road with guide poles marked by bands of red and white. From Mason City to Des Moines over good dirt roads most of the way you will travel 134 miles passing through Sheffield, Hampton, Iowa Falls, Radcliffe, Story City, Ames and Ankeny.

Guided again by the red and white bands on the telephone poles as you head toward St. Joseph, Mo., 193 miles to the southwest, the towns by the way will be Booneville Sta., Winterset, Macksburg, Afton, Tingley, Mt. Ayr, Redding, Grant City, Gentry, Stanberry, Rochester. Crossing the Missouri river at St. Joseph proceed via Wathena, Troy, Everest, Horton, Whiting, Holton, Mayetta, Hoyt, to Topeka, a distance of 103 miles. The run to Emporia from here measures 75 miles and passes through Burlingame, Osage City, Lebo. At Emporia you will touch the Santa Fe trail which you will follow for 28 miles to Elmdale, at which point you had best make inquiry regarding the road to Marion which is only a short distance, but not on the Santa Fe trail, or you might continue on the trail to Florence and then turn north to Marion, but this would be a trifle longer.

Or, should you wish to visit Kansas City, after leaving St. Joseph, the towns you would make are Russville, Atchison, Lowemont, Leavenworth. After leaving Kansas City run through Martin City and Olathe to Gardner where you may leave the main thoroughfare and run west to Scranton, then turning southwest through Burlingame and Osage City where the trend is again westward through Allen, Council Grove, Delevan and Herington where another turn to the south is made leading into Marion.

### Detroit-Yellowstone Park

**Conway, S. C.**—Editor Motor Age—Is it practicable to take a motor car trip from Detroit to Yellowstone park thence to Denver, leaving Detroit early in June? Are motor cars allowed in the park? What would be the routing to see the best developed farming sections? Where can route books covering this section be bought?—F. A. Burroughs.

If you defer your trip a couple of weeks, you will most likely find the roads in a more settled condition. In Illinois the main route leads through sections principally devoted to dairy products. Iowa is the farming state, and the North Platte valley country of Nebraska is the cattle grazing portion.

The Detroit-Chicago road is a distance of 319 miles traversed through Dearborn, Wayne, Ypsilanti, Ann Arbor, Chelsea, Jackson, Albion, Marshall, Battle Creek, Galesburg, Summerville, Niles, South Bend, New Carlisle, LaPorte, Westville, Valparaiso, Deep



River, Merrillville, Schererville, Highlands, Hessville, Grasselli, Whiting and South Chicago.

The Chicago-Clinton stretch is 148 miles and the itinerary Maywood, Lombard, Geneva, DeKalb, Creston, Rochelle, Ashton, Franklin Grove, Dixon, Sterling, Morrison, Fulton and Lyons. Across Iowa the main cities are DeWitt, Lowden, Mechanicsville, Mt. Vernon, Cedar Rapids, Walford, Amana, Marengo, Ladora, Brooklyn, Grinnell, Kellogg, Newton, Colfax, Altoona, Des Moines, Waukee, Adell, Dexter, Stuart, Casey, Wyota, Atlantic, Marne, Walnut, Avoca, Minden, Neola, Underwood, Weston and Council Bluffs.

The North Platte route across Nebraska extends through Elkhorn, Waterloo, Fremont, Ames, Schuyler, Benton, Columbus, Clarke, Central City, Chapman, Grand Island, Wood River, Shelton, Kearney, Elm Creek, Lexington, Willow Island, Gothenburg, North Platte, Sutherland, Paxton, Ogalalla, Brule to Julesburg, Colo.

In order to visit Denver after you have been to the park, it will be necessary to return over the same road. In taking in Denver on the way you will come south to Denver from Julesburg going through Sedgwick, Proctor, Sterling, Hillrose, Fort Morgan and Bennett.

Coming back to the transcontinental road at Laramie by passing through Broomfield, Lafayette, Longmont, Berthoud, Loveland, Fort Collins, LaPorte, Ingleside and Laramie, the routing lies north as far as Ogden, Utah, the itinerary that far being Medicine Bow, Hanna, Fort Steele, Rawlins, Wamsutter, Table Rock, following signs over the new cut-off to Point of Rocks and Rock Springs and on through Green River, Granger, Liman, Ft. Bridger, Dog Springs, Spring Valley, Evanston, and a fine drive of 82 miles through Castle Rock, Echo and Weber canyons to Ogden.

Two days will be taken to reach the park, and the road lies through Pleasant View, Hot Springs, Brigham City, Honeyville, Deweyville, Fielding, Cherry Creek, Malad, Arimo, McCammon, Onyx, Inkorn, Portneuf, Pocatello, Ross Fork, Blackfoot, Shelley, Idaho Falls, Rigby, Lorenzo, Rexburg, Salem, St. Anthony, Ora, and the Yellowstone station. Motor cars will be allowed access to the park, but the government has not as yet completed its necessary arrangements.

The route books necessary will be volumes 4 and 5 and can be secured at \$2.50 each from the Automobile Blue Book Publishing Co., Karpen Building, Chicago.

#### Omaha, Neb.-Deadwood, S. D.

Omaha, Neb.—Editor Motor Age—Kindly suggest the best routing to Hot Springs and Deadwood, S. D.—E. J. Busch.

There are two routes to be considered for this trip. One presents the best roads but through the cattle-grazing country of Nebraska, while the other leads through the Bad Lands of South Dakota, where the intensely interesting and peculiar rock formations are the attractive feature.

For the latter mentioned route a connection can be made at Sioux Falls, S. D., with the Sioux Rapids, Ia., itinerary following it to Rapid City, then heading south 60 miles over good natural roads through Hermosa and Fairburn to Hot Springs. From Hermosa a run can be made to Guster and Sylvan lake.

To reach Sioux Falls a run of 204 miles is necessary, taking the road through Iowa from Council Bluffs to Crescent, Reels Store, Missouri Valley, River Sioux, Whiting, Salix, and Sioux City. Two or three miles before reaching River Sioux is quite bad in wet weather. The small towns of Westfield, Akron, Hawarden, Hudson, Fairview, Beloit, Canton and Harrisburg are run through to Sioux Falls.

The option to the above is the North Platte road across Nebraska followed as far as Julesburg, Colo., in the Conway, S. C., routing, then continuing west to Sidney, where a 187-mile ride over natural roads will lead through Broadwater, Alliance, Dunlap, Chadron and Oelrich to Hot Springs. To reach Deadwood from Hot Springs it is 60 miles through Fairburn, Hermosa and Rapid City.

#### Would Drive to Banff, Alberta

Baltimore, Md.—Editor Motor Age—Would it be possible with any degree of comfort to motor from Glacier park, or some station on the route to that point from Minneapolis as shown in Motor Age, April 10, to Banff, in Alberta? If possible give the stopping points which can be made without too great fatigue for women. Would I be obliged to take out a Canadian license?—G. Holt.

By no means attempt a motor car trip to Alberta with women. It is a hard trip for men, and it is very doubtful even if they would complete a trip to Banff.

#### St. John, Kan.-Adel, Ia.

St. John, Kan.—Editor Motor Age—Kindly advise the best route to Adel, Ia., and what Blue Book I might find useful on my trip.—G. D. Wellepp.

Hutchinson is 55 miles through Stafford, Zenith, Sylvia and at this point the Blue Book, volume 5, can be taken up for the remainder of the journey. Following the Santa Fe trail to Emporia is through Halstead, Newton, Peabody, Florence, Clements, Elmdale, and Cottonwood Falls, and a short-cut to Hiawatha which is all right in summer months through Lebo, Osage City, Burlingame, Wakarusa, Topeka, Hoyt, Mayetta, Holton, Whiting, and Horton. It is 133 miles to Omaha passing through Falls City, Verdon, Howe, Nebraska City, Murray, Flattsmouth, La Platte, Fort Crook, and Albright.

Take the River road through Council Bluffs, Weston, Underwood, Neola, Minden, Avoca, Walnut, and Marne, then the White Pole road through Wyota, Casey, Stuart, Dexter, and Earlham to Adel.

#### Sioux Falls, S. D.-Blackfoot, Idaho

Edgerton, Minn.—Editor Motor Age—Kindly give a route from Sioux Falls, S. D., to Blackfoot, Idaho. Also state whether the part of the route across the mountains is covered with washed gravel or otherwise made suitable for rubber casings.—J. A. Tabbert.

You might follow the instructions given to the Sioux Rapids, Ia., inquirer, coming south from Bozeman to Yellowstone station and Idaho Falls to Blackfoot. The road through the Black Hills is fine, and the scenery, particularly in the Spearfish canyon, is one of the talking points of all earnest "See America First" campaigners.

#### Sioux Rapids, Ia.-Great Falls, Mont.

Sioux Rapids, Ia.—Editor Motor Age—I will drive from here through northern Iowa to Great Falls, Mont. I understand there is a good St. Paul-Helena road. Would going through South Dakota be best?—L. Torkelson.

The St. Paul-Helena road of which you speak is the one the A. A. A. tour will take this summer for its annual tour. Although it is routed with running directions in the Blue Book the entire distance, which is not true of the other northern roads, there is one great draw-back. New land is constantly being taken up, fences are erected surrounding this land, and time after time you will find the road running into a fence which necessitates following it around until you get back to the road again. Consequently the guide will not apply in such cases.

Motor Age believes you will find the South Dakota scenic route much more to your liking. The Blue Book has this routed to Deadwood, and as it goes through the Bad Lands and the Black Hills it is an enjoyable trip. The balance of the road to Great Falls is not hard to follow through Spearfish, Sundance, Wyo., Gillette, Sheridan, Billings, Mont., Big Timber, Livingston, Bozeman, Townsend, Mitchell, Helena, Cascade and Great Falls.

From Sioux Rapids to Deadwood your routing is as follows: At Spencer, 18 miles north, you follow the road to Sioux Falls, 109 miles through Everly, Hartley, Sanborn, Sheldon, Hull, Rock Valley, Inwood, Canton and Harrisburg.

Sioux City to Sioux Falls is 87 miles through Jefferson, Elk Point, Beresford and Worthing, then the Scenic route is followed west to Rapid City, 383 miles. The itinerary is Bridgewater, Emery, Mitchell, Mt. Vernon, White Lake, Kimball, Pukwana, Chamberlain, Reliance, Kennebec, Presho, Draper, Murdo, Okaton, Stamford, Belvidere, Kadoka, Weta, Conata, Farmingdale, Caputa, Going through Sturgis will take you to Deadwood, and through Spearfish canyon to Sundance.

#### Tecumseh, Neb.-Chicago

Tecumseh, Neb.—Editor Motor Age—Please give me the best route from Tecumseh, Neb., by the way of Des Moines to Chicago.—A. C. Erickson.

Proceeding first through Graf and Rohrs to Auburn you will turn north to Nebraska City, thence east to Sidney, Shenandoah, Clarinda and Conway to Mt. Airy. From here to Des Moines your way will lie through Tingley, Afton, Winterset. Continuing toward Chicago you will now traverse the River-to-River road which runs through Mitchellville, Colfax, Newton, Grinnell, Marengo, Iowa City and Wilton to Davenport. Passing through Moline and East Moline, Lyndon, Sterling, Dixon, Franklin Grove, Rochelle, DeKalb, Geneva, Lombard and Maywood will bring you into Chicago.

#### Sterling, Neb.-Chadron, Neb.

Sterling, Neb.—Editor Motor Age—Can Motor Age give us the best touring route to Broken Bow, Neb., thence to Kimball and up to Chadron? We wish to route via Lincoln, Neb., unless a better route can be suggested. We are planning on making the trip some time this summer, possibly in June.—F. G. Roberts.

To go via Lincoln will be your best route, as this is the nearest point at which you can reach the main-traveled cross-state routes. To reach Lincoln, go through Sterling, Douglas, Panama, Hickman, Saltville. A fine, dragged dirt road will be enjoyed all the way from Lincoln to Grand Island, the itinerary being Seward, York, Bradshaw and Aurora. Taking up the Platte Valley route at Grand Island, you will run through Wood River, Shelton, Kearney, Elm Creek to Lexington. To reach Broken Bow, continue on this transcontinental road beyond Lexington to the graded county road that leads north to Buffalo, Oconto and Broken Bow. This spur of road from the main line will have to be retraced to proceed to Kimball, turning west on the Platte Valley road from the graded county road to Cozad, Gothenburg, Brady Island, Maxwell, North Platte, Hershey, Paxton, Ogalalla, Brule Station, Julesburg, Chappell, Lodgepole, Sidney, Potter, Owasco and Kimball. With Chadron the next objective point, you should return to Sidney, then turning north pass through Broadwater, Alliance and Dunlap to your destination. Blue Book, Volume 5, will be found very helpful in routing over the North Platte road, and from Lincoln to Grand Island.



# The Readers' Clearing House



## CARBON CAUSES MOTOR TO KNOCK Engine Pounds Badly When Throttle Is Open and Gears in High

PARDEEVILLE, Wis.—Editor Motor Age—I have an E-M-F-30 1910 model which is bothering a little. It pounds badly if the throttle is opened very much on high gear, and sometimes on low when on common roads even with the spark retarded. It also runs jerky when going slow on high gear, and is the same on second gear if the throttle is open very much.—Leonard Dalton.

You are not definite in stating the characteristics of the motor under varying conditions. That the motor pounds may be due to a number of things, but a common complaint is pounding due to carbon. A deposit of carbon on the cylinder head and piston will cause preignition and hence a knock. This may be heard with the spark retarded or advanced and at low or high speeds. The loss of power or jerking, as you mention, gives one to believe that carbon is the cause, for when carbon is present in a cylinder a loss of power is evident and the motor will overheat.

However, that the motor jerks may be due to a slipping clutch—that is, the motor is throttled too low for the load it is carrying, causing the clutch to slip and the motor to pound. If a heavy carbon deposit is present the motor will heat rapidly, a loss of power will be evident; it may backfire, although not necessarily; the longer the motor runs the worse the knock.

It will run well for the first few minutes and as soon as it heats will pound. Motor Age suggests putting a half-tumblerful of kerosene into each cylinder and allow it to remain in the cylinder over night. This will tend to loosen the carbon, which may blow out with the exhaust gas when the motor is again started. If the kerosene does not help on the first trial, try it again. If this does not cure the knock the carbon must be scraped.

## WANTS WIRING OF MEA MAGNETO Oil Will Cause a Dry-Plate Clutch to Slip —Ford Motors Tested

Dresden, N. Y.—Editor Motor Age—Will oil or water on the plates of a dry-plate clutch cause the clutch to slip?

2—How many miles per hour will the Hupmobile roadster make on high gear?

3—Which one of the transmission shafts on the Studebaker six has plain bearings?

4—Show by diagram the construction and wiring of the Mea magneto.

5—Are all of the Ford motors tested before leaving the factory?—A Subscriber.

1—Oil will cause the clutch to slip. Oil has a more detrimental effect on the plates of a dry-plate clutch than water. The only attention that a dry-plate clutch needs is treatment with kerosene three or four times a year. The kerosene is squirted between the plates by means of a squirt gun. The liquid will dissolve any oil present and tend to make the plates grip more firmly. Water tends to rot the facing of

## Questions Answered and Communications

Leonard Dalton....Pardeeville, Wis.  
A Subscriber.....Dresden, N. Y.  
H. C. Merrill.....Cleveland, O.  
Vernon P. Hill.....Waco, Tex.  
Badger Kid.....Janesville, Wis.

the plates and may cause slipping.

2—The Hupmobile 32 has made as high as 48 miles an hour.

3—The countershaft of the Studebaker six gearset operates on plain bearings.

4—A wiring diagram of the Mea magneto is shown in Fig. 1. The arrangement of the high-tension wires C in this diagram would fire the cylinders 1—4—3—2, but to fire in the common order 1—3—4—2 one would have but to connect the wire leading to No. 4 plug to No. 3 plug and change the one leading to No. 3 plug to No. 4 plug. The armature in this magneto carries a low-tension primary and a high-tension secondary winding connected in series, consequently no auxiliary induction coil is required. The low-tension winding ordinarily is short circuited by a breaker which opens at certain points of each revolution with the result that a high voltage is generated across the high-tension winding at the moment of the break, and a spark is produced across the spark gap in the cylinder to which it is connected.

In the diagram the primary winding is represented by P and the secondary or high-tension winding by D. The two windings are connected in series. The high tension lead C communicates between this brush holder G and the revolving segment

of the high-tension distributor H. The ground connection of the spark plugs I is represented by the dashed lines A. The primary circuit is represented by the line B, which shows communication between the circuit breaker E and the armature. The condenser is represented at F.

5—Yes.

## READER IS DESIGNING A CYCLECAR Differential Expensive and Unnecessary With Narrow Tread

Cleveland, O.—Editor Motor Age—I am designing a light cyclecar to be driven by a two-cylinder motorcycle motor, and for this purpose I would like Motor Age to furnish me with the principle dimensions and location of points of support on a typical motorcycle engine.

My car has a tubular frame about 12 inches between members where the engine will be mounted.

2—What is the best method of supporting it?

3—What are some makes of motors especially well adapted to cyclecar application?

4—Who makes the smallest and lightest differential, no larger than is needed for a cyclecar?

5—What is the best type of combination radial and thrust bearing? I want a self-contained bearing which does not require adjustable mountings.

6—Of whom can I obtain ring sprockets that may be interchanged with the crown gear on an ordinary differential?—H. C. Merrill.

1—The average crankcase is from 9 to 10 inches in diameter and has the motor crankcase tiebolts spaced equally about the rim, generally six or eight, as shown in Fig. 2. The width of the crankcases vary.

2—Fig. 2 shows a method of mounting the motor from these bolts by means of angle pieces, L, of sheet steel bolted to the tubular sidebars, as shown. The small casting, B, shown in the detail being used to distribute the strains on either side and make a flat-faced seat for the nut.

3—The motors now available for cyclecars are the Spacke, of Indianapolis, Ind.,

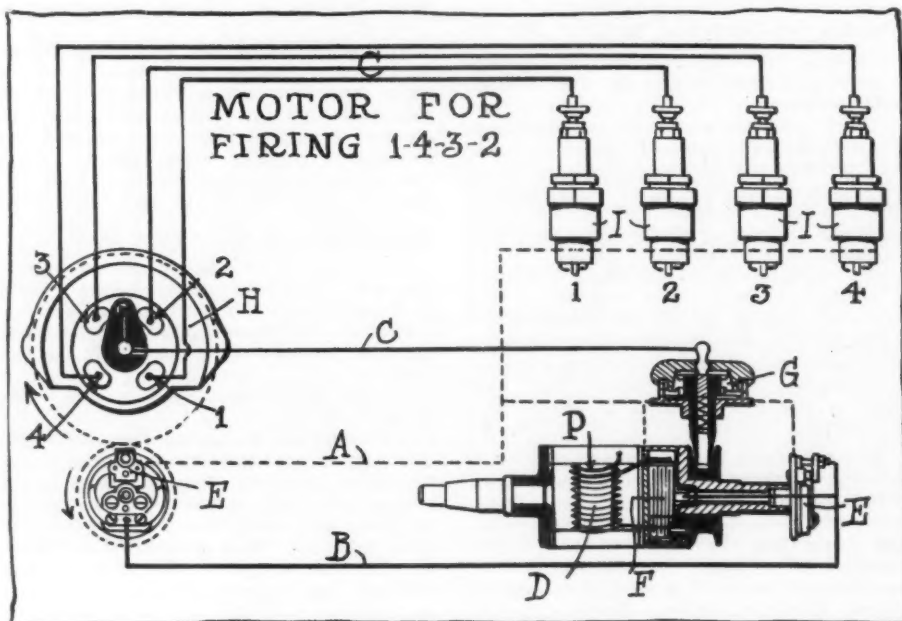


FIG. 1—WIRING DIAGRAM OF MEA MAGNETO



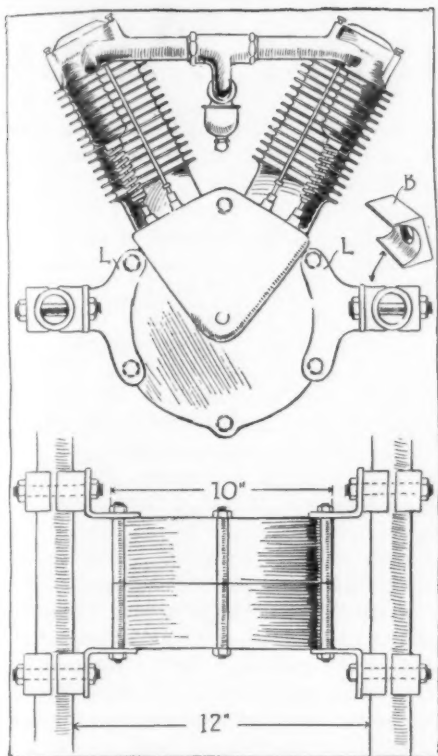


FIG. 2—METHOD OF HANGING MOTOR ON CYCLE CAR

the Wizard, of Indianapolis, Ind., and the Mack overhead-valve motor built by the Universal Machinery Co., Milwaukee, Wis. These are from 5 to 9 horsepower, air-cooled V-type motors.

4—A differential is not necessary on a narrow 36-inch tread cyclecar, whether driven by chain or belt. One can be made of cast gears good enough for cyclecar work if desired, or any of the gear companies might make a special type. We know of no differentials now made for cars as small as this.

5—For cyclecars the cheapest thing that will do the work and do it well is needed. For this reason some type of cheap pressed steel bearing of extra size is probably best, though if money is no object any of the standard radial and thrust bearings will do as well or better. It is all a question of cost.

6—These would be made by the firm making the differential, no doubt.

#### WIRE WHEELS INSTEAD OF WOOD

#### Fuel Question Agitating Texan—Coal Oil a Question of Carburetor

Waco, Tex.—Editor Motor Age—Can Rudge-Whitworth wire wheels be fitted on a 1913 Cadillac? If so, what would be the approximate cost, including one spare wheel?

2—Are the bearings of the wheel left in it when removed, or are they on the hub?

3—Can 36 by 5-inch tires be put on the 1913 Cadillac? If so, state what changes would be necessary.

4—Could motor spirits and kerosene be used in the carburetor of a Ford 1912 model without making changes?

5—In the May 8 issue of Motor Age a description of a transcontinental trip was published. What was the approximate cost of this trip, including gasoline, oil, tubes and casings?

6—What are the conditions of exchange of casings mentioned in this account?

7—Could motor spirits and kerosene be used in the carburetor of the 1913 Cadillac and with what adjustments?

8—Can a Stromberg or Harroun carburetor be fitted to this car? How?

9—What is the price of each of these for four-cylinder cars?

10—Does kerosene produce more carbon than gasoline?

11—Does motor spirits?

12—Will the Stromberg carburetor take kerosene the same as gasoline, and motor spirits?—Vernon P. Hill.

1—Yes; the cost would be \$300, approximately.

2—If American Substitution hubs are used with the wire wheels the cost for fitting a Cadillac would be \$75. If the Substitution hub is not used, but instead the marketed types of wire wheels and their accessories the cost would vary from \$125 to \$300, according to the make of wheel used. With the Substitution hub the bearing of the wooden wheel is retained, whereas in the other cases the entire wooden wheel with its bearing is discarded.

3—The wheel would have to be changed, under which condition the car guarantee is forfeited.

4—Some owners of Fords are mixing kerosene and gasoline with satisfactory results. There is no reason why motor spirits could not be substituted for the gasoline.

5 and 6—This information may be had from A. N. Mead, 395 Broadway, New York; Martindale Mercantile Co.

7—Motor spirits could be used without any change except to give slightly more air. To use kerosene there would need to be some means of heating it and of running on gasoline till the motor warms up.

8—Stromberg carburetor will replace the present one without change. To use the Harroun carburetor on kerosene changes outlined in No. 7 would be necessary.

9—This depends on the size.

10 and 11—This depends on the carburetion. In the Harroun carburetor there seems to be no difference.

12—Kerosene, no; Motor Spirits, yes.

#### TWO COOLING SYSTEMS DESCRIBED

#### Properly Designed Air-Cooled Engine Performs as Well as Water-Cooled.

Janesville, Wis.—In what country is the Mercedes car manufactured?

2—Kindly describe the air-cooling system such as used on the Franklin and Keeton cars. How can air-cooled cars run as well as water-cooled cars in very hot weather and in desert races?

3—What cars use the Wisconsin motor?

4—What motor does the Mercer car use?—Badger Kid.

1—Germany.

2—The Keeton car is not air-cooled. It is thermo-syphon water-cooled. In this system there is no pump. The water is contained in a radiator behind the motor and a steep pipe extends from it to the jackets of the cylinders. The hot water from the cylinder jackets will rise to the top, a characteristic of water. The hot water will rise in the water pipe and make its way finally to the radiator. This is shaped as shown in Fig. 3. The flywheel has incorporated with it a turbine. This is nothing more than a series of blades on a rim and it acts just like the common office electric fan. When this revolves with the flywheel, air is forced into the hollow

of the radiator, as shown by the arrows in the illustration. This is a means of cooling the radiator and hence the water contained therein. After the hot water becomes cool it drops lower and lower in the radiator. When it reaches the bottom it makes its way again to the cylinders where it is heated and again brought back to the radiator.

The Franklin car is cooled differently, being dependent upon air, solely. In other words it is an air-cooled motor. The cylinders of this motor have flanges integral with them. These flanges have sharp edges. It is known that heat will radiate to the points. If you were to place a pointed piece of metal in a fire, allow it to become heated and then withdraw it, you would find that the point and surrounding metal was hotter than that part remote from the point. The flywheel of the Franklin is also an air turbine and is constructed somewhat similar to the Keeton turbine. In the Franklin that portion under the hood is divided into two parts when the hood is down. The turbine draws air through these two compartments and past the flanges.

The action then is as follows: The heat of the cylinder wall is taken away by the flange. The heat goes immediately to the sharp edge of the flange and the air passing the sharp edge carries the heat away. The reason sharp edges are used, is to get the heat away from the cylinder and keep it away until air carries it off.

The Franklin design has been demonstrated to be very efficient. The current of air rushing past the flanges of the cylinders keep the motor as cool as if the cylinders were water-jacketed. Of course, in some air-cooled engines the same design is not used. There may be some fallacy in the construction. There is no reason to believe that an air-cooled engine such as the Franklin cannot perform as well as a water-cooled engine.

3—Cutting, Stutz, Kissel small six, Republic and Keeton.

4—Its own, made at the Mercer factory.

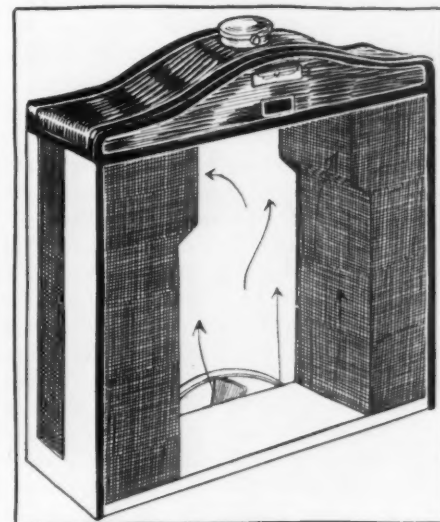
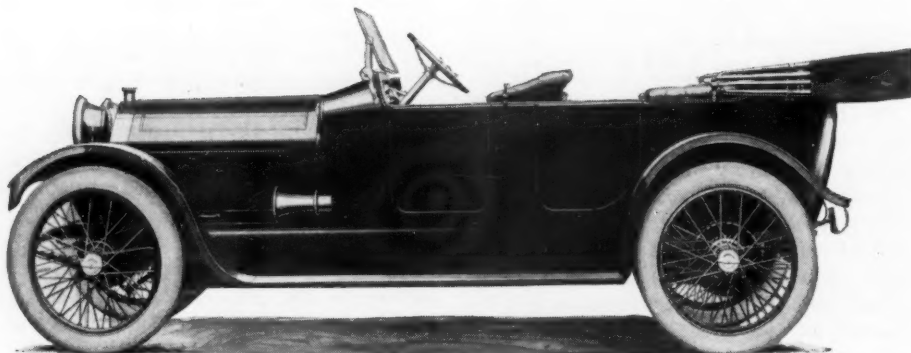


FIG. 3—KEETON RADIATOR SHOWING AIR CURRENTS

# Henderson Joins Six-Cylinder Army



FIVE-PASSENGER SIX-CYLINDER HENDERSON

**S**IX-CYLINDER adherents have gained another recruit in the Henderson which has just announced a six as the leader of the 1914 line. In addition to the new six there is a new four, called the De Luxe, while the light four, which was the sole chassis model for this year, is retained. The new six-cylinder model has  $3\frac{3}{4}$  inches bore and  $5\frac{1}{2}$  inches stroke and develops 54 horsepower according to factory tests. The de luxe four has cylinders  $4\frac{1}{8}$  by  $5\frac{1}{2}$  inches in size and is catalogued at 46 horsepower. The light four which is carried over from this year with minor refinements is of the same bore as the new four but its stroke is only  $5\frac{1}{4}$  inches and the factory credits it with 44 horsepower. Three models are all of the same general chassis layout, differing only in power. These chassis will be furnished in five-passenger touring, roadster, coupe and sedan bodies.

Wheelbases of the three models for the new season are: Six, 126 inches; de luxe four, 116 inches and little four 116 inches. Tires on all models are 35 by  $4\frac{1}{2}$ -inch.

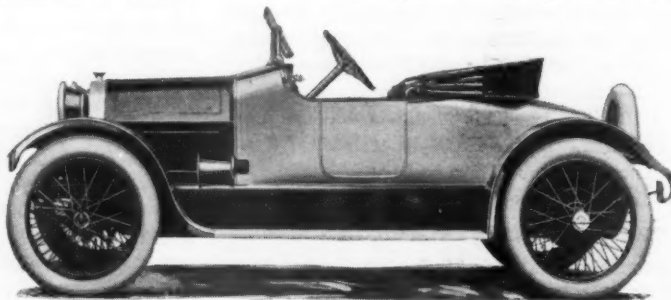
#### Wire Wheels and Kerosene Carbureter

With the new four and six-cylinder cars, an option of either wood or McCue wire wheels is offered without change in price. In furnishing the wire wheels, an extra wheel is included, and with the wood wheels demountable rims and an extra rim are included. In addition, the Harroun carbureter is named as optional equipment at a slight extra charge instead of the Rayfield, which is the regular equipment. The Harroun carbureter is adapted for the use of either gasoline or kerosene or both, and the adjustment for the various fuels is made from the dash. Instead of the hot-air jacket from around the exhaust employed with the Rayfield, when the Harroun is specified exhaust gas is led from the manifold around the venturi

tube of the carbureter and back to the exhaust pipe through a by-pass.

The motors are all Buda make, L-head, cast in block and in general design are the same as the motor employed this year. The front support of the motor has been altered somewhat. The front point of the three-point support is now a trunnion on an extra cross arm under the front end of the motor. The sight oil level on the left side of the engine has been moved back to a point where it is more easily seen.

Motor starting is by a Ward-Leonard electric cranking and lighting system, the same as last year, but there have been slight changes in the location and arrangement of the parts. The generator is



FOUR-CYLINDER DE LUXE ROADSTER

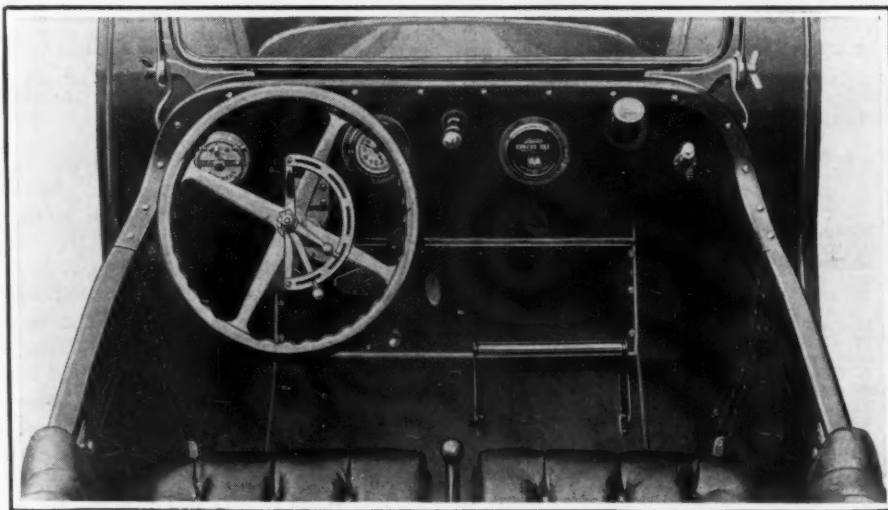
mounted just behind and driven from the timing gears by a helical gear instead of from the camshaft as in the 1913 arrangement. Teeth for the cranking motor are cut in the flywheel instead of being on a separate band shrunk on the flywheel as in the previous installation.

The hood is shorter in the new cars in proportion to the size of the body and the dash gasoline tank is slanted down and inwards to give more knee room in the front compartment. A lock has been added to the gearshift lever to hold the second speed gears in mesh. This lock is automatic and the shift from second to high cannot be made until a catch is released. This is arranged so that the release and shift are accomplished in one operation. The fuel filler pipe comes out in the dash in the new cars instead of the top of the cowl as in former practice. In the coupe body the gas tank is located under the rear deck, the only case in which the Henderson idea of dash gas tank is departed from.

Both fours have thermo-syphon cooling and the six is cooled by water circulated by a pump. The Eisemann high-tension dual magneto is regular equipment on all models, and is set close up to the fan pulley on the left side of the motor and all ignition wires are enclosed in a nickel tube. All motor mountings, such as water manifolds, breather tubes, etc., are nickel.

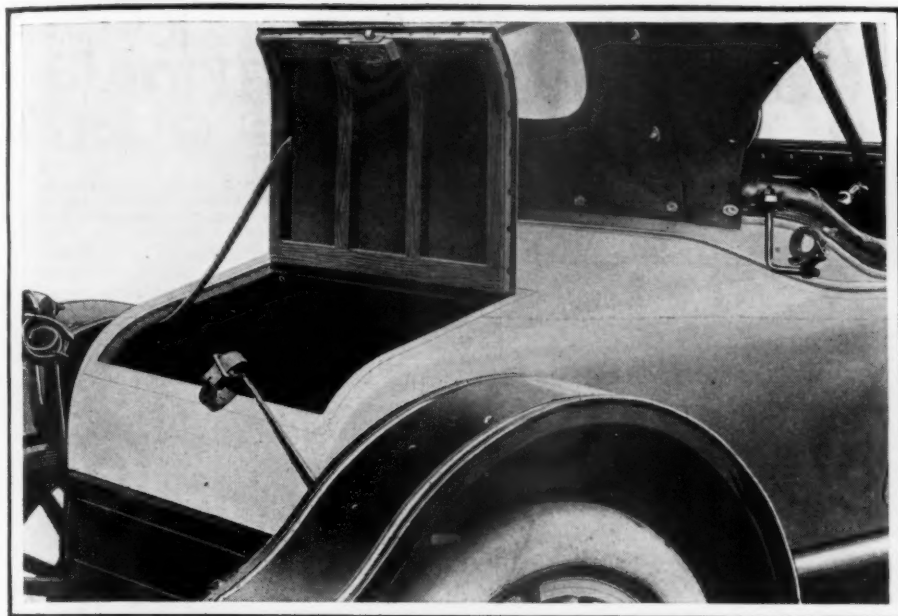
#### Henderson Gearshift Continued

The Henderson center control and left drive continue in the 1914 series. The center control in the Henderson is the only one of its kind in America. The center control lever is placed between the two front cushions and instead of the conventional H quadrant being placed in a horizontal plane it is mounted vertically and the lever moves up and down and forward and backward in a very short radius. The



VIEW OF DRIVING COMPARTMENT SHOWING SHIFTER LEVER KNOB BETWEEN THE SEATS, ALSO GASOLINE FILLER CAP ON DASH





COMPARTMENT IN REAR OF HENDERSON ROADSTER

second and third-speed slots are placed at the bottom and have the shortest movement as these are the two speeds used most in driving.

The left pedal combines the clutch and service brake, and the right pedal is the emergency brake and is fitted with a ratchet that catches in the toe board which enables the driver to set both brakes without taking his hand off the steering wheel. The operation of the electric starter is accomplished by a smaller pedal than the clutch or emergency brake pedal, and is situated between the two leaving the floor board clean. The brakes can be taken up without getting under the car as the equalizers are placed under the floor board and forward of the front seat. Brakes on the new cars are concentric expanding band. The older model has the bands side by side.

The gearset is mounted on the rear axle as in all previous Henderson models and contains three speeds. One feature of a gear box on the rear axle is that it is believed more accessible than if it were placed amidship and the grind of the gears is not transmitted through the body. The spring suspension is the same as in former Henderson models, a 38-inch semi-elliptic front and a 50-inch three-quarter-elliptic rear spring. The Stutz rear system is used on both fours but the six has Weston-Mott floating axle with Covert gearset.

#### Dash Gasoline Tank a Feature

The Hendersons were the first in America to adopt the construction that suspends the fuel tank in the dash cowl, and this is retained in the models of the 1914 series. With this construction the carburetor always has a supply of fuel, on any grade as the tank is much higher than the carburetor. This construction also admits of the mounting of the carburetor high on the motor. This gives a short intake manifold that gives good results with low-grade

gasoline, and also makes the carburetor very accessible.

The instrument board in front of the fuel tank presents an attractive appearance. All instruments are heavily nickel plated, and from left to right are as follows: magneto switch, 8-day clock, dash lamp, speedometer, fuel tank filler cap, and carburetor adjustment. All instruments are mounted flush with the dash board. The clock and speedometer are of the same size and the dials are black with white characters which make them easy to read while driving at night. The electric light switch is placed back of the center control lever, between the front seats where the driver's hand would fall naturally.

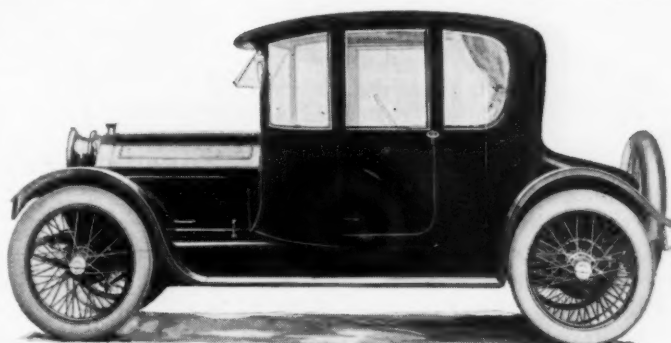
The floor boards are clean, no instruments or levers making it hard to get in or out of the front compartment. The accelerator pedal, cutout and other floor instruments are nickel plated. A new feature of the Henderson 1914 models is the location of the electric horn button. This button is inserted in the top of the steering column just above the pivot of the spark and throttle levers. This makes it possible for the driver to have his horn within reach at all times, as well as making a very neat construction.

The one-piece windshield that featured the 1913 Henderson models is retained. This shield can be adjusted so that it will ventilate the front compartment or can be lowered and give the driver a clear vision. A rubber skirt on the bottom of the shield prevents the rain from being blown in.

The upholstery of the Henderson models, touring and roadster, is machine buffed leather with turkish effect. The tops are of silk mohair. The coupe and sedan models are upholstered in gray whipcord. The standard colors of all models are dark olive and gray at the option of the purchaser. The battery box is placed under the right front seat, and the tools are carried under the left front seat, which leaves the running boards free with no obstructions to hinder easy ingress or egress from front or rear doors of car.

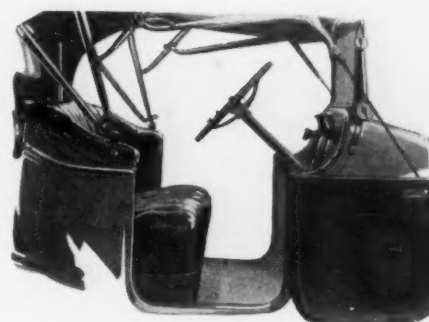
#### MOTORISTS' BOOKMAN

The Maine Road Book and Pine Tree Tour for the 1913 season conveys almost the scent of pines from its clean-cut pages, freely illustrated with views from the rocky coast to shadowy, road-rimmed lakes in balsam groves among the mountains. This tour, consisting of a series of twenty-six daily jaunts, covering a distance of 853 miles, is so arranged that ample time is allowed for thorough enjoyment of the country through which the motorist passes.



THREE-PASSENGER SIX-CYLINDER COUPE

And by camping at the end of the short day's drive also gives opportunity for penetrating many a delightful region which cannot otherwise be visited on account of lack of hotel accommodations in these out-of-the-way spots. White bands on the telegraph poles and signboards guide the traveler the entire length of the tour. A number of supplementary tours are also suggested. The maps include a folding map of the state, one of the coast from Boston to Portland, and a half-page map of the Old Orchard tour. The book is issued by the Maine Automobile Association, Portland, Me., and may be obtained upon request.



SHOWING CLEAR FLOOR BOARDS AND TOP STRAP FASTENING TO COWL



# The Motorist's Kindergarten



**EDITOR'S NOTE**—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

**CLUTCH** operation and construction has been described in previous articles, and it was said that the object of the clutch was to separate the motor from the speed changing means.

The simplest type of means for speed changing is called the friction drive. The friction drive is nothing more than one disk at the end of a shaft which is attached to the crankshaft of the motor; and this disk rubs against another disk.

Here the motor is shown connected to a shaft and the shaft is connected to a disk. This disk is faced usually with metal. At right angles to this disk is another one, as the illustration shows. This one is faced with fiber. The first mentioned disk is called the driving disk and the other one is called the driven disk. The driven disk is on a square shaft to which is attached a gear or sprocket. The object of this gear is to turn a chain which runs to the rear axle, upon which is the differential.

## Separating the Disks

In a friction-driven car there are two pedals just like most of the cars have, and two levers, a shifter and brake. By pressing one pedal the driving disk is moved away from the driven disk. The other pedal is the service brake. By moving the handle or shifter lever the driven disk slides upon its shaft back and forth, as the situation dictates. Let us suppose that the motor is running and the car is standing still. The disks must be in neutral position. This means that the driven disk is separated from the driving disk by pressing a pedal.

Now as the shifter lever is moved it pushes the driven disk. The nearer the

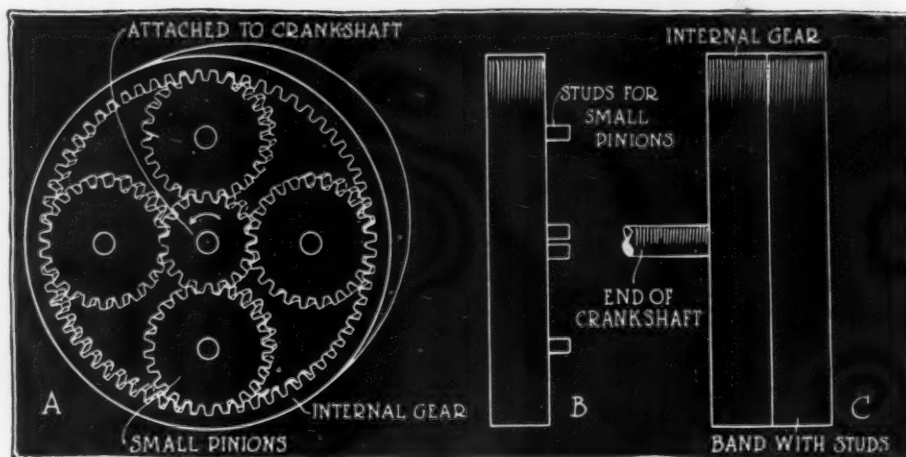


FIG. 67—CONSTRUCTION OF PLANETARY GEARSET

## Speed-Changing Devices

driven disk gets to the outside rim of the driving disk the faster the former turns. High speed then is at the very farthest point on the driving disk, as shown in Fig. 68. Reverse is exactly the opposite—that is, if the disk is pushed way over on the other side the car will reverse.

### Two-Speed Planetary Gearset

Besides the friction drive there is another which is quite simple. It is called the planetary gearset because it resembles the planets revolving about the sun. The planetary gearset is shown in Fig. 67. This is a two-speed gearset and consists of five gears and two bands. Referring to A, in the illustration, it will be noted that the little gear in the middle is attached directly to the crankshaft of the motor. The other four gears run on studs

or axles. These studs are on a band B.

The big band into which all the little gears fit is called an internal gear because it has teeth on the inside. When the whole thing is together it looks like that shown at C. This is a side view. Around the outside of the internal gear is a brake band just like the brake bands on the rear wheels of some cars. The band with the studs also has a brake. For low speed a pedal is pressed. This applies the brake to the internal gear and holds it still. The small pinions turn around on their studs and carry with them the band with the studs. For the reverse, a pedal is pressed which operates a brake on the band with the studs. This holds the band still and the action of the gears is opposite from before. For high speed the whole mechanism turns around and at the same time the little pinions remain still.

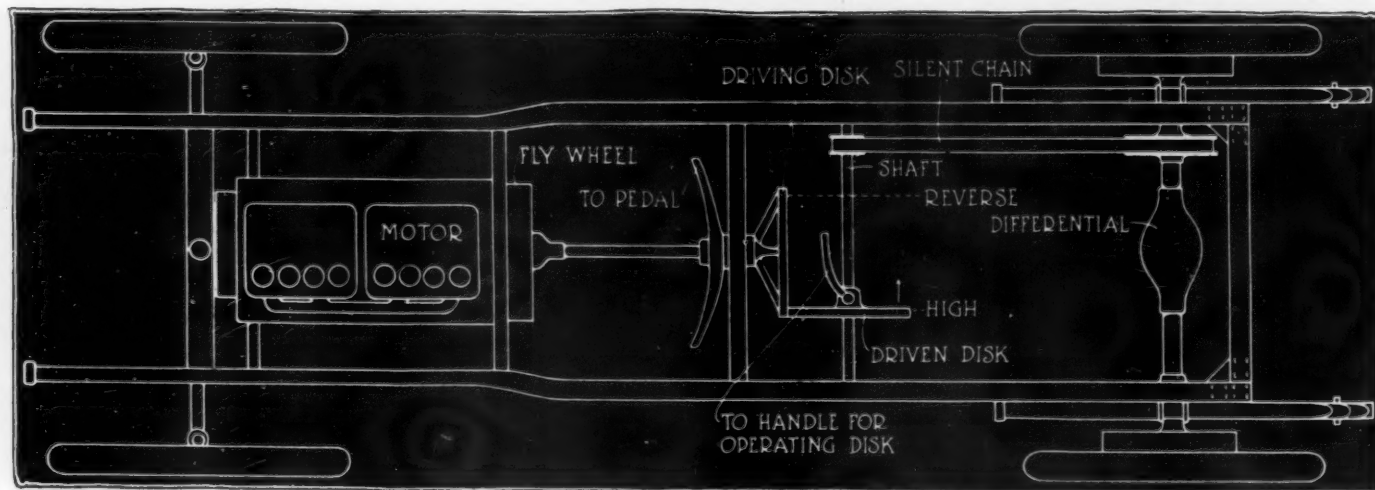
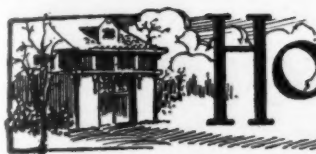


FIG. 68—ARRANGEMENT OF PARTS OF FRICTION DRIVE





# Housing the Motor Car

The Apartment  
House  
Garage

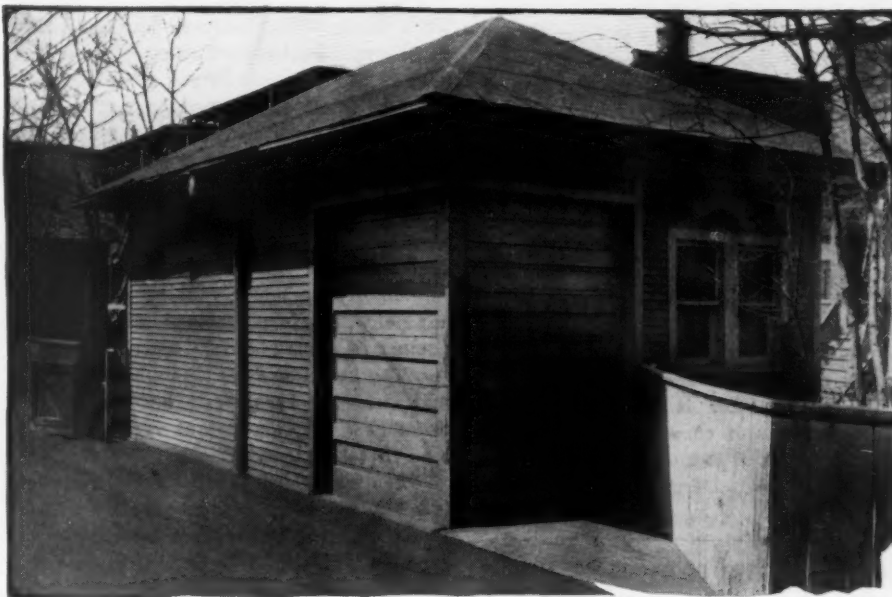
WHEN it comes to utilizing little space for the construction of a garage and building one that is odd in appearance, C. L. Ibson, a Chicago manufacturer, is to be put in the class with the prize winners. Mr. Ibson had a lot 16 by 22 feet and wished to build a garage to house his Rambler car which has a 120 inch wheelbase, and at the same time provide enough room for a small repair shop, a heating plant and other garage necessities. The difficulty arose in designing a suitable entrance to the building, for if the alley side were used there would be insufficient room to get the car in its proper position. There was not enough room on either of the other three sides to permit of the entrance of a car without great difficulty, if at all. The plan, which is well illustrated in the photograph of the garage on this page, was hit upon finally and without doubt the 16 by 22 garage is one of the best to be seen in the vicinity as far as equipment and accessibility of materials is concerned.

## Ingenious Door Arrangement

As will be noticed the building was erected with a slice cut from one of the corners. In other words two pieces one 5 feet long and the other 6 were cut from two sides of the building and into these cuts the sliding doors were placed. When these doors are opened there is an entrance about 8 feet wide, which is ample.

The garage is of wooden construction, with the exception of the floor which is cement. There is a drain in the middle of the floor, which is graded.

Although the photograph on this page does not show many windows the lighting



DISTINCTIVE MOTOR CAR HOUSE BUILT AND OWNED BY C. L. IBSON, CHICAGO

facilities of Mr. Ibson's garage are well planned. That part of the building shown in the photograph faces the east and the owner has found that most of the real repair work is done in the afternoon hence the reason for the four windows on the side of the building facing west. Auxiliary lighting is obtained by numerous drop lights and wall brackets.

The drop lights are used principally when washing the car, so that the person performing the operation may bring the light underneath the chassis and see just where he is spraying the water.

## Heating Method a Feature

Perhaps the most important feature of Mr. Ibson's garage besides the novel entrance is the heating arrangement. It was found that if the heater was placed in a corner of the building it would take up much valuable room and at the same time might cause excessive smoke in the garage. To avoid these things, the heater was placed outside of the garage as shown by the floor plan in the lower illustration. This heater is of the hot-water type and the water supply is kept in a tank suspended near the ceiling on the inside of the garage. The water feeds automatically and the heater consumes very little coal, considering that it heats a 16 by 22 building. The hot-water pipes extend along the west side of the building for about 10 feet.

The gasoline supply is kept in an underground tank and is brought to the garage by a hand pump situated in a corner of the building as shown in the floor plan on this page. The oil is kept in a tank near the gasoline pump. It will be noticed that

the heating apparatus is opposite the gasoline pump to prevent any gasoline catching fire.

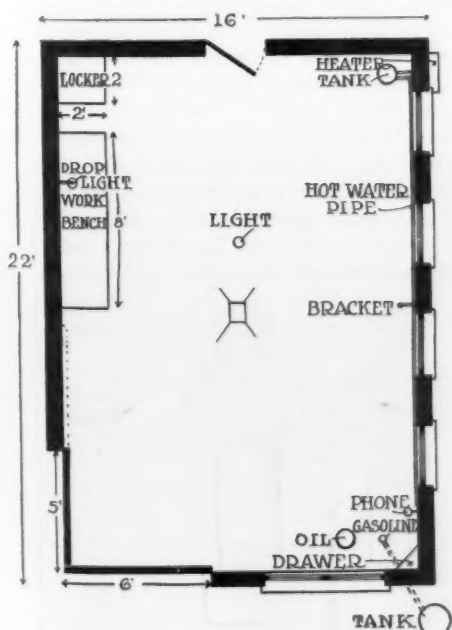
An 8-foot work bench is provided and, although it may seem that there is little room to do any real repairing, it might be said here that the car which is housed in the garage was overhauled not long ago, any very little inconvenience encountered in the work.

## Garage Has Storing Facilities

At one corner of the room is a locker for the storing of motoring apparel and at the other a three-sided drawer where the bills pertaining to the garage and the car, are kept. It will be noticed that every part of the garage is used for some convenience and yet there is no detracting from its roominess. This is true even when the car is in the garage.

The two sliding doors are locked from the inside so that after the car is driven out the chauffeur must return to the building by the small door and lock the sliding doors. The opening of the sliding doors is rather an inconvenient operation, especially on a stormy night. The driver must go around to the small door, enter the garage and open the sliding doors and then drive the car in. This seems to be the only objection to the present design of Mr. Ibson's garage.

There is but one entrance for the car and that is through the alley, but a door on a short side of the building permits of the entrance of people from the house of the owner. The wooden structure with its tar-papered roof cost \$300 without equipment.



FLOOR PLAN OF ODDLY CONSTRUCTED GARAGE

# With Accessory Makers

## Fire Out Fire Extinguisher

THE manufacturers of fire extinguishers evidently have been watching closely the reports of the fire insurance companies as regards the number of fires of motor cars, for within the past few months a number of new fire extinguishers have been brought out. Among them is the Fire Out, a product of the Inst. Lighter Co., Columbus, O. The extinguisher is contained in a brass cylinder which is designed to be placed under the hood of the car and fastened by four screws. The feature of the extinguisher is the fact that its action is automatic, in that it comes into play as soon as flame envelopes it. The head of the extinguisher is of fusible metal and melts when it comes in contact with flame. As soon as it melts the extinguishing fluid is released from the brass cylinder and sprayed. The position which the extinguisher takes is responsible, somewhat, for the direction of the spraying of the extinguishing fluid. It is said that the liquid which issues from the extinguisher in no way affects the motor and that electrical apparatus is not short-circuited after having been sprayed with the substance.

## Ricker-Bennett Paints

The Ricker-Bennett Co., North Cambridge, Mass., is offering a paint for motor cars which is said not to crack even when struck with a hammer. The application of the paint manufactured by that company is said to leave the surface elastic and in that way makes it immune to the action of hard bodies. The maker claims that the seventy-two stains marketed for motor cars are not made dull after the car has been washed.

## G. C. Vaporizer

A product that is claimed to handle kerosene and low-grade fuels and effect a saving of 25 per cent in the fuel bill, is being offered by the G. C. Vaporizer Co., New York, as the G. C. Vaporizer. This device, shown in Fig. 3, is a combination muffler and vaporizer. The funda-

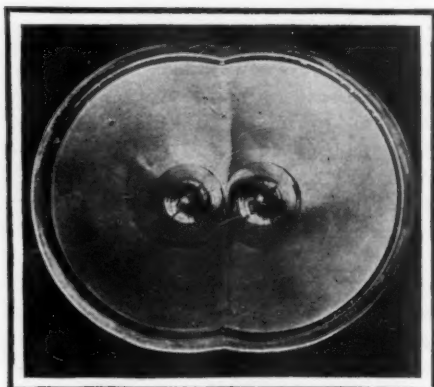


FIG. 1—AVERY COMPOUND REFLECTOR.

mental principle upon which this vaporizer works is the utilization of the heat of the exhaust. The ordinary muffler is dispensed with entirely. The most important part of the device is in the form of a cylinder in which there are hollow iron bars.

These bars are spaced to permit of the passage of kerosene vapor mixed with air past them. The iron bars are designed to retain the heat of the exhaust long enough to impart that heat to the kerosene. The fuel is drawn into the vaporizer by the suction of the motor. It passes through a pipe which is perforated with a large number of holes about 1/16 inch in diameter. The kerosene falls through these holes and onto the bars made hot by the exhaust gas. At this instant vaporization is said to take place.

When vaporized the kerosene is drawn into the cylinders with a quantity of air. Initial starting is obtained by the use of gasoline. This is to be carried in an extra

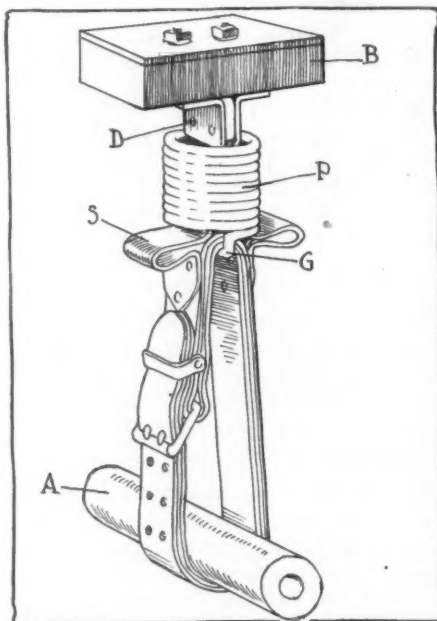


FIG. 2—HOOVER SHOCK ABSORBER

tank, as shown in Fig. 3. After the motor has become sufficiently hot the gasoline fuel supply is shut off and the kerosene admitted. The vaporizer itself is the size of the ordinary muffler.

## Hoover Shock Absorber

A simple form of rebound check is the product of the W. H. Hoover Co., New Berlin, O. This shock absorber is illustrated in Fig. 2, and primarily consists of a strap, S, which goes underneath the axle, A, and a spring, P. The illustration shows the shock absorber in its normal position, the portion B being part of the floor of the car. The absorber is held firmly to the floor by the angle plates D, which also partially sup-

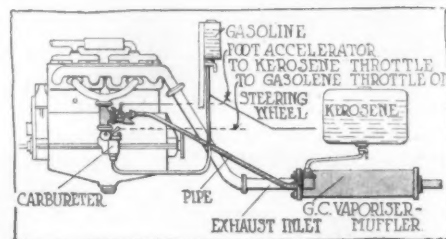


FIG. 3—G. C. VAPORIZER INSTALLED

port the spring, P. It will be seen that the spring is fastened at the lower end by the loop G. When the car rides over bumps or hollows in the road the body of the car sinks downward and then upwards suddenly. As soon as the body starts on its upward journey the spring P begins to stretch and the slack is taken up in the strap. Thus the Hoover permits the body to come down freely but allows it to go upward gradually. As may be seen from the illustration the strap is adjustable both for wear and the variations in car sizes.

## Speed-O-Line

The fuel problem seems to have as firm a grip on manufacturers as it has on the public, judging from the number of products being introduced which are claimed to reduce the yearly fuel bills. The latest recruit to the field is Sterns & Heberlee, Minneapolis, Minn. Their product is in the form of a liquid hydrocarbon known as Speed-O-Line, which is mixed with gasoline. The proportions vary with the type of engine. The maker claims that the product will save much in the fuel bill.

## Avery Compound Reflector

Light reflecting is a problem that has confronted the manufacturers of lamps for years. Makers are trying to get the greatest possible light from a given source and each year sees devices of various sorts that are claimed to intensify the light of incandescent lamps. The parabolic reflector is perhaps one of the most effective means for reflecting light, and this form of light magnifier is being marketed by the Avery Portable Light Co., Milwaukee, Wis., in a novel form. The Avery reflector

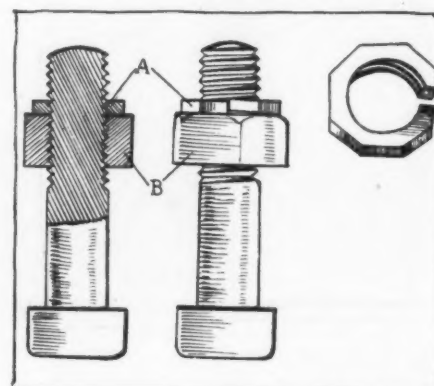


FIG. 4—SWENSON LOCK NUT



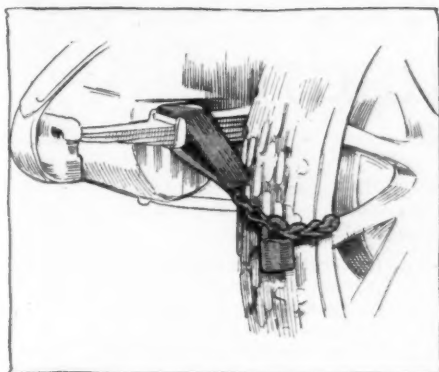


FIG. 5—AMERICAN CHAIN CO.'S NEW TIRE LOCK

is shown in Fig. 1. As will be noted, it consists of two sections of five-eighths parabolic reflectors. These pieces are made of metal and are cast together making a one-piece reflector. There are two sockets, each carrying a tungsten bulb of 8 candle-power. The two lamps are wired in parallel so that one lamp will burn even if the other is broken.

#### American Chain Tire Lock

The American Chain Co., Sherrill, N. Y., is marketing a lock which may be used for preventing extra tire theft or car theft, according as the position of the lock. The lock is illustrated in Fig. 5, drawn around the spring and tire of a motor car. The links of the chain are flat, which gives the chain the action of a strap. With this design it is possible to bring the chain very tightly around the tire.

#### Hampton Kerosene Carbureter

A carbureter which utilizes gasoline, kerosene and water vapor in the proper portions, as fuel for internal combustion engines, is announced by the Hampton Carbureter Co., New York. Instead of attempting to gasify the fuel mixture, the Hampton carbureter atomizes the fuel, which is vaporized completely, it is said, by the action of a certain amount of the heat of the exhaust.

A cross sectional diagram of the carbureter is shown in Fig. 6. Before explaining the action of this new device the lettered portions will first be explained. K is the intake for the kerosene, and G the gasoline intake. The exhaust inlet is shown at E and the exhaust outlet at O. The water intake at W and the spray nozzle for the complete fuel at N.

It will be noticed that there are two float chambers, one for gasoline and the other for kerosene. There are two air inlets just as the conventional form of carbureter, one the primary and the other the auxiliary ports. The latter has a double adjustment.

Gasoline is used for initial starting and after the motor has gotten under way with gasoline the latter supply is discontinued and the kerosene substituted. In its action the water is sprayed and mixed with the sprayed kerosene, which mixture enters the mixing chamber of the carbureter.

Here the finely divided particles are heated by the heat of the exhaust which is passing continually around the chamber. The initial spraying and later heating is said to produce a fuel whose heat value is extremely high and at the same time forms a resultant vapor which offers little resistance to perfect flame propagation. This condition would seem to give rapid and nearly perfect combustion of the fuel.

The addition of water vapor to the kerosene in the proper portion is said to hinder carbon deposits and cause the fuel to be burned completely.

#### Beckley-Ralston Tools

The Beckley-Ralston Co., Chicago, is marketing a tool kit which has some exceptionally good features. Besides containing every conceivable instrument for use by the average owner, some of these tools are so designed as to be applicable to a number of different operations. For example, a carbon scraper of the double-end

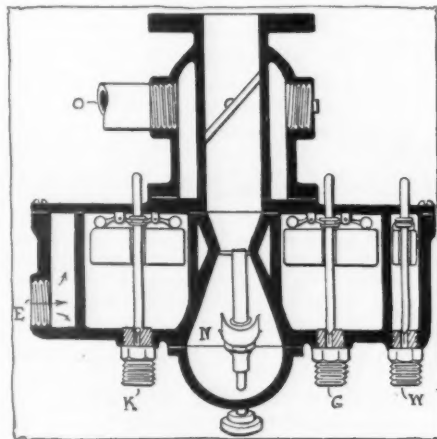


FIG. 6—CROSS SECTIONAL DIAGRAM OF HAMPTON CARBURETER

form is part of the kit. This scraper is shown in Fig. 8 in the lower illustration. Usually two scrapers would be carried, but the manufacturer found that two instruments could be formed into one, thus saving space and cost and at the same time making an efficient tool. Often one is at a loss to understand why the tire tool could have been left in the garage, and this being a very important part of a car's equipment, the Beckley-Ralston Co. has incorporated a tire tool with a monkey wrench. This double instrument is shown at the top of Fig. 8. It is this combining one tool with another that makes this tool kit valuable, for in this way one may carry twice as many tools without using any more space than usual. It will be noticed that the monkey wrench has its handle curved at the end, just as a tire tool is curved.

#### Duplex Punctureless Inner Tire

A tire filler which assumes an unusual position in the tire casing has been brought out by the Duplex Inner Tire Co., St. Louis, Mo. The filler in a tire is shown in Fig. 7. The portion F is the filler and is in the form of a spongy cellular substance. This is put into the tire

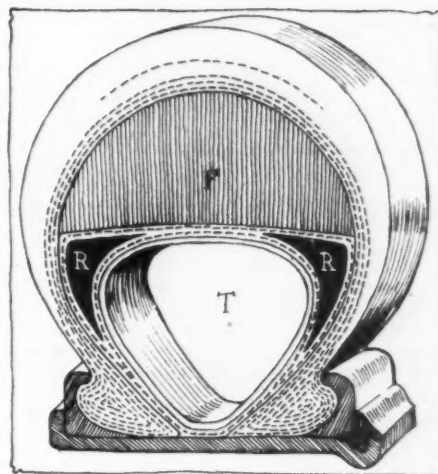


FIG. 7—SECTION OF DUPLEX TIRE

casing in an elliptical shaped mass. Over it is placed an inner casing, R, made of rubber and fabric. Inside this casing is the ordinary inner tube, T. The maker claims that the tire cannot be pierced and the air permitted to escape unless a sharp body 3 inches long punctures the tire.

#### Swenson Locknut

What is said to be an efficient locknut is being marketed by the Swenson Never Loosen Locknut Co., Ottumwa, Ia. The locknut consists of a tempered steel ring, A, in Fig. 4. The regular nut B is placed on the bolt and the lock nut placed over it. As the locknut is tightened it tends to flatten out. When in this position the threads of the locknut bind against the threads of the nut underneath, thereby holding it in place. The maker claims that in recent experiments, the nut was 100 per cent efficient.

#### Dust-Proof Luncheon Outfit

Not even the details have been neglected in supplying for motorists every possible convenience, for a dust-proof lunch basket is the latest. This is a product of the Icy Hot Bottle Co., Cincinnati, O. Within the basket may be carried a full course dinner without the fear that the food will become fouled by the dust of the road entering the basket. It is equipped with utensils of every description together with a bottle which keeps liquids at a uniform temperature for 3 days.

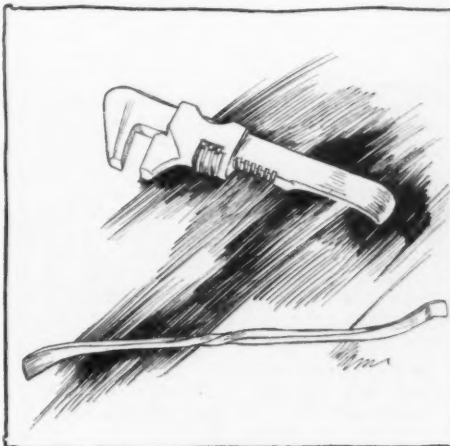


FIG. 8—BECKLEY-RALSTON TOOLS



# From the Four Winds



## Recent Club Happenings

**T**HE Alexandria Automobile Club, of Alexandria, Minn., has elected officers as follows: President, G. A. Kortsch; vice-president, C. H. Bronson; secretary, F. M. Nelson; treasurer, Dr. J. J. Volker; governors, H. E. Ginkery, Osakis, A. J. Ostrom, Evansville, Carl Olson, Brandon, W. K. Barnes, Alexandria. Formation of an Osakis Good Roads Club was authorized in lieu of the formation of another motor club. The association has posted 85 miles and built and commissioned four road drags.

The Rochester Automobile Club, of Rochester, N. Y., has moved its headquarters from the Hotel Seneca to Powers hotel.

The Ontario Motor League has taken the first step toward a federation of the motor clubs of Canada. Letters have been written to organizations in the larger cities asking for expression of opinion upon the formation of a dominion association and suggesting that a conference be held in Toronto while the Canadian Highway Association is in session this summer.

The Altamont Automobile Club, recently organized at Altamont, N. Y., and affiliated with the New York State Automobile Association and the A. A. A., has elected officers as follows: President, D. H. Whipple, Altamont; vice-president, J. H. Leonard, Albany; secretary, G. C. Donohue, Altamont; treasurer, E. G. Crannell, Albany.

At a recent meeting held at Albuquerque, N. M., of the New Mexico Good Roads Association the following officers were elected: President, R. F. Twitchell, East Las Vegas; general vice-president, Francis E. Lester, Las Cruces; secretary, F. L. Grose, Albuquerque; treasurer, John Becker, Jr., Belen; executive committee, Don J. Rankin, D. K. B. Sellers, A. B. Stroup, Albuquerque; auditing committee, J. W. Corbett, Mountainair; W. M. Atkinson, Roswell; Lee F. Elliott, Las Cruces. Resolutions were adopted at the meeting recommending the early completion of the scenic highway through the Pecos National forest between Las Vegas and Santa Fe; the early completion of the Camino Real or main highway from the northern to the southern boundary of the state and the construction of a bridge across the Rio Puerco on the Camino Real. It was also urged that there be made a complete revision of the state road laws.

The North Milwaukee Good Roads Club has been organized at North Milwaukee, a suburb of Milwaukee, to induce action toward the permanent improvement of principal highways between the city and suburb, and beyond. Dr. J. H. Rohr is president. Half of the membership consists of farmers from various townships affected by the proposed plans.

The Danville Auto Club, of Danville, Ill., at a meeting recently decided to take active steps towards acquiring the Waubesa trail extended from Champaign to Indianapolis via Danville, Covington and Crawfordville. The trail is routed west from Champaign across the state of Illinois and the eastern extension will be laid out during the coming summer.

At a recent meeting of motorists of Odessa, Minn., the Odessa Automobile Club was formed and the following officers elected: Guy Eddy, president; John La Lond, vice-president; E. H. Kollitz, secretary; and J. C. Gans, treasurer.

**Y. M. C. A. Opens Motor School**—The Y. M. C. A. of Findlay, Ohio, has started a motor instruction department under the management of Fred W. Zoll.

**Free Rides for 53,200 Kiddies**—The joy-giving car of Charles Boyer, Harrisburg, is again on the move and already 3,000 kiddies have rode in the car this spring and summer. Since the car has been in operation on the streets of the capital city the past 2 years, 53,200 children have occupied seats in the car.

**Tires Are Cheap in Brazil**—An impetus is to be given the motor car trade in all parts of South America by the establishment of rubber manufacturing plants in Brazil. In Brazil tires will be retailed considerably cheaper than in any other country. Other countries will profit by the lower freight charges. In addition to the Goodrich Tire and Rubber Co., which has a government contract for the erection of a factory and a washing plant, other firms will engage in rubber manufacture.

**Claims World's Largest Truck**—The H. R. Gibbons Box Co., of Chicago, has just received delivery of what is claimed to be the largest motor truck in the world, the truck being nearly 30 feet long and the body alone 24 feet. The truck was built by the Sternberg company, of Milwaukee, the size of the body being due to the kind of load to be hauled, this being more of bulk than weight. The machine is to operate mainly between Chicago proper and South Chicago, and whereas horse outfits make but one trip a

day it is expected that this machine will make four to six, with twice the load of a horse vehicle each time.

**Ask for Traffic Commission**—The Automobile Club of Maryland has passed resolutions asking Governor Goldsborough to appoint a traffic commission to consider fair and just laws governing all kinds of traffic. The resolution calls for the appointment of three members representing the motorists, three representing horse-drawn vehicles and three representing pedestrians and have such a commission make a report to Governor Goldsborough and the legislature at its next meeting.

**Over 61,000 Cars in Pennsylvania**—The Pennsylvania state highway department, motor division, has passed the 61,000 mark of registrations. This is 1,700 ahead of the total registration for 1912 and 5,000 of the 1912 registrations to this date.

**Badgers Buy 175 Cars Daily**—Alexander J. Cobban, in charge of motor registry in the secretary of state's department of Wisconsin, predicts that the Wisconsin passenger car registration for 1913 will reach 30,000. On May 12 the registry passed the 25,000 mark, and on May 21 license No. 26,442 was issued, meaning that on May 21, 1913 the registry was nearly 900 in excess of the total registry for the entire year of 1912. The number of new cars that are being purchased in Wisconsin daily total more than 175.

**Milwaukee Inter-Club Run June 28**—Saturday, June 28, has been selected as the date for the first annual Milwaukee inter-club, a team match trophy tour between the Milwaukee Athletic Club and the Milwaukee Automobile Club. The run will be modeled along the lines of the annual competition between the Chicago Automobile Club and Chicago Athletic Association. For the first event, lenient distance and rules will govern, the tour to be from Milwaukee around Lake Geneva and return. A limit of fifteen cars from each club will be set, but non-contestants and official cars will bring

## GOVERNORS WHO MOTOR— HAINES OF IDAHO



**T**HE new governor of Idaho, John M. Haines, is a thorough business man, first, last and all the time. He is a man of few words, but he has a habit of doing things. Although he has been in the governor's chair only a few months he has shown that he is a force to be reckoned with in governing the state, and his political opponents are coming to realize this fully. Early in his business career Governor Haines showed his foresight and acumen by adopting new methods and new ideas whenever they seemed to him to be worth while. In the early days of the motor car he became a user of a car, and he has kept one or more in commission in his business almost ever since. The governor enjoys a long country tour as much as anyone, and when the cares of office permit this coming season, he and Mrs. Haines will steal away for a day or so to some of the many picturesque spots within 100 miles or so of the capital city. "I can do a day's work in an hour when my lungs are filled with fresh air," said the governor, "and I like to get into the open country and see things grow."



the total number up to thirty-five or forty cars. A \$250 trophy in the form of a shield faced with a silver plaque has been donated by Harry A. Apple.

**Motorists Favor Light Law**—The Pennsylvania Motor Federation is fighting for the senate bill which requires all vehicles to display a light at night. The bill has passed the senate, but is being held up by the public roads committee of the house.

**Motor Line in Argentina**—Mail and passengers are to be carried on a new motor line from Rosario, Argentina, to several small places in the interior. Four cars will be used in the service, which will maintain a schedule. The government pay for the mail is sufficient to cover the expenses of operation. The returns from the passenger business are expected to be sufficient to cover the interest on the investment and leave a fair profit to the owners.

**Grand Rapids Run Sanctioned**—Official sanction No. 577 has been allotted by the contest board of the A. A. A. for the second annual reliability run for Grand Rapids motor car dealers and private owners, promoted by the Grand Rapids Herald and given under the auspices of the Grand Rapids Automobile club. The tour will be held July 21 to July 25, inclusive. The route will be the central highway to Mackinaw, returning via the Lake Michigan coast semi-boulevard trail.

**Good Roads in Uruguay**—Touring out of Montevideo, Uruguay, to nearly any part of that republic is practicable. There are several hundreds of miles of improved roads in the region surrounding the capital. In other parts of the country there has been less attention paid to roads but constant use of the highways in the rural districts by the broad wheeled oxcarts makes a good surface for motor cars. Occasional deep ruts are the worst drawback. They are the cause of some inconvenience at times but are not a serious feature at all.

**Fee for Motoring Peddlers**—Attorney-General Hogan of Ohio was called upon recently to give a peculiar opinion relative to changing license fees for peddlers who used motor cars. The law provides that a peddler going on foot shall pay a fee of \$12 yearly; on a horse or with a one-horse wagon, he is to pay a fee of \$20; if he uses a two-horse wagon a fee of \$28; and if in a boat or on a railroad train, \$60. When he uses a motor car no fee was provided, and the attorney-general ruled that it was a two-horse wagon and the peddler will have to pay \$28.

**German Cars Lead in Brazil**—Increasing sales of German cars in Brazil are declared to be due to the fact that full lines of repair parts are carried in stock by the agents of the German manufacturers. American cars are popular but parts can be obtained only by sending to the United States. Government statistics for 1912 show that 2,994 cars of European manufacture entered the republic, while 783 American cars were received. Those familiar with conditions declare that the proportion could be reversed if the business was intelligently nursed for a year or two by American manufacturers.

**Shake-up in Milwaukee Club**—A shake-up in the administration of the Milwaukee Automobile Club has resulted in the resignation of the president and first vice-president, and a rearrangement of the other officers, as well as the infusion of new blood on the directorate and official slate. At a special election on May 29, Frederick Gettelman, for 2 years second vice-president, was chosen president. William H. Raymond was elected first vice-president. Julius O. Frank was elected second vice-president. Secretary Leonard E. Meyer was elected temporary treasurer. Mr. Frank was added to the board of directors.

## Good Roads Activities

**SUMMER** cross-the-state trips from St. Louis to Kansas City having become decidedly popular with motorists, St. Louis motor enthusiasts are deeply interested in the announcement that an oiled road from Kansas City to its watering place, Excelsior Springs, is being effected. The trip from Kansas City to Excelsior Springs has long been a favorite with visitors to the Kaw city, but a hard one on account of the bad dirt roads.

The Citizens' Business League of Milwaukee has taken over the funds, material, tools and program of the Chicago-Milwaukee Good Roads Association and proposes to carry the project of improving one good, direct highway between Milwaukee and Chicago to a successful completion. It was at the instance of the league that the association was organized by Chicago and Milwaukee business men and motorists early in 1912.

Polk county, Iowa, of which Des Moines is the county seat, will improve 120 miles of road this summer. Twenty thousands dollars has been appropriated by the board of supervisors for the work.



### CONTESTS

- \*June 7—Quaker City Motor Club and motor clubs of Delaware country interclub run; Philadelphia, Pa.
- June 10—Reliability, Columbus, O.
- June 14-15—Track meet, San Francisco, Cal.
- June 12-13—Interclub match, Chicago Athletic Association-Chicago Automobile Club.
- June 16-18—Reliability, Columbus Automobile Club, Columbus, O.
- \*June 19—Algonquin hill climb, Algonquin, Ill.
- \*June 21—Cincinnati, O., hill climb.
- June 21-22—Track meet, Portland, Ore.
- June 23—Iowa State Automobile Association tour.
- July 1—Indianapolis to Pacific coast tour; promoted by Indiana Automobile Manufacturers' Association.
- July 1-16—Motor plow competition, Winnipeg, Can.
- July 4—Track race, Columbus, O.
- July 4—Track race, Washington, D. C.
- July 4—Track meet, Taylor, Tex.
- July 4—Los Angeles—San Francisco road race.
- \*July 4-5—Track meet, Sioux City Auto Club.
- \*July 5-6—Road race, Tacoma, Wash.
- July 12—French grand prix.
- July 11-19—A. A. A. endurance run, Minneapolis to Glacier Park, Mont.
- July 20—Track race, Seattle, Wash.
- July 21-25—Reliability tour, Grand Rapids, Mich.
- July 28-30—Galveston, Tex., beach race.
- August 12—Kansas State Automobile Association endurance run to Colorado Springs.
- August 29-30—Elgin road races, Chicago Automobile Club.
- August 30-September 6—Reliability run, Chicago Motor Club.
- September 9—Corona beach race, Cal.
- September 1—Track race, Columbus, O.
- September 21—French light-car road race, Boulogne.
- September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
- October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
- \*November 24—Vanderbilt road race at Savannah, Ga.
- †November 27—Savannah grand prix.

### MEETINGS

- June 5-7—Mid-summer meeting S. A. E., Detroit.
- June 23-28—International road congress, London, Eng.

\*Sanctioned by A. A. A.  
†Sanctioned by A. C. A.

A pike, 50 feet wide, from Huntville, Ala., to the Tennessee river, has been surveyed and construction work is now in progress. The road will be surfaced with macadam.

Colbert county, Alabama, is spending \$20,000 on improved highways. This county has the reputation of having more motor cars in rural districts than any other county in the state, and with the exception of Montgomery and Jefferson counties, it has the greatest mileage of improved roads.

Work on the new road to connect Fort Worth and Dallas, Tex., has been begun. This is the first work to be done since the floating of the \$1,000,000 bond issue for better roads. This road will be surfaced with a petroleum product.

Milwaukee will apply 200,000 gallons of road oil and 50,000 gallons of asphaltum oil to its macadam streets during 1913. Contracts were awarded May 17 to the Standard Oil Co. for the 200,000 gallons of road oil at 4.7 cents per gallon, and to the Barber Asphalt Paving Co. for the 50,000 gallons of asphaltum oil at 7.8 cents per gallon. Two years ago both classes of oil were much lower in price, and the cost of oiling streets has increased from 35 to 45 per cent in that time.

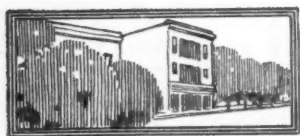
Arrangements are to be made by the United States department of agriculture, through Logan Waller Page, director of the office of public roads, to place on exhibition at the Panama-Pacific exposition in 1915 the greatest collection of road models ever displayed in any part of the world. The models will furnish exact duplicates of the old Roman roads, French roads, and all of the various types of modern roads, together with miniature models of road machinery operated by electricity. The office of public roads made an exhibit of road models for the first time at the Alaska-Yukon-Pacific exposition.

A total sum of \$5,400,000 is estimated will be collected this year to be used solely in the improvements of the roads in the state of Kansas. The sum represents all poll taxes to be collected, and the revenue to be derived from the licensing of motor cars and motorcycles. An aggregate of \$4,716,247 was spent last year.

The Aurora-Elgin highway which comprises 23 miles of the famous Chicago-Elgin-Aurora century drive, will have a veneer of concrete if the plans of good roads enthusiasts are carried out.

Boosters of the Mississippi scenic route are busily engaged in working up interest in the transcontinental route between Chicago and the west, via Rock Island and Davenport. It is desired to build a hard road between Watertown and Morrison. The Tri-City Ocean to Ocean Highway Association, which was organized in 1912 and of which A. E. Nissen of Davenport is secretary and treasurer, has succeeded in accomplishing great results. One road, known as the Chicago, Tri-City, Omaha route, seems to be popular with transcontinental tourists and appears to be a logical crossing of the Mississippi for all west-bound travelers in motor cars.

The Milwaukee department of public works intends to make wide use of a preparation called glutrin, as a dust-layer and preservative for macadam streets. As an experiment, twelve blocks on Fourth avenue, Milwaukee, were treated with glutrin last summer, and inspection on May 1, 10 months later, shows the street to be in excellent condition. Glutrin is a by-product of tamarack timber and forms a hard surface on macadam that withstands the elements and heavy traffic better than any material yet used in Milwaukee. The cost is approximately \$100 per city block, considerably more than other preparations, but the results are claimed to offset the greater initial expense.



# Among the Makers and Dealers



**REGAL Triples Its Capital**—The Regal Motor Car Co. of Syracuse, N. Y., has increased its capital from \$1,000,000 to \$3,000,000.

**Overland Engineer To Europe**—Carl A. Neracher, chief engineer of the Willys-Overland Co., has been sent to Europe for the purpose of visiting and studying the leading motor car manufacturing concerns.

**Johnston To Bowling Green**—The Bowling Green Motor Car Co. of Bowling Green, Ohio, has secured R. K. Johnston, formerly connected with the Garford, to take charge of the manufacturing end of the business.

**Minnesota Factory for Prest-O-Lite**—The Prest-O-Lite Co. has bought a block of land at St. Louis Park, a suburb of Minneapolis, where it will erect a large manufacturing plant. The cost will be about \$100,000.

**Will Build 1,000 Cars in 1914**—The Allen Motor Co., Fostoria, O., has recently increased its capital stock to \$500,000, with \$300,000 paid in. The officials say they will market 100 cars this year and 1,000 next year.

**Reduces Capital Stock**—Papers have been filed with the secretary of state reducing the capital stock of the B. F. Goodrich Co. of Akron, O., from \$200,000 to \$10,000. Since the merger of the Goodrich and Diamond companies, a separate corporation has been formed under the laws of a foreign state.

**Barden Truck Company Official**—Glenn W. Barden has been appointed secretary and treasurer of the Kelly-Springfield Motor Truck Co., Springfield, O. Mr. Barden was formerly auditor of the Warren Motor Car Co., Detroit.

**Seattle Plant For Goodyear**—The Goodyear Rubber Co., Akron, O., has commenced the construction of an elaborate factory building in Seattle at Eleventh avenue and East Pike street. It will have a total floor area of 10,000 square feet.

**Testing Track For Overland**—The Willys-Overland Co. has purchased sufficient land in the rear of its Toledo plant to build a ½-mile testing track. This track will do away with the necessity of testing cars on the city streets.

**Wagner Ajax Tire Official**—Fred J. Wagner, who has been identified with the motor industry as race starter extraordinary and in many other capacities, has entered the tiremaking end of it. He has just been elected vice-president of the Ajax-Grieb Rubber Co., maker of Ajax tires.

**Addition to Gordon Factory**—The contract for a \$25,000 addition to the plant of the Gordon Rubber Co. has been awarded to Melbourne Bros., and the work of construction will be started at once. The addition will consist of two separate wings to the present factory.

**Build Foundry for Castings**—A new gray iron foundry to supply castings used in the construction of motor parts manufactured by the concern is to be built by the Lewis Electric Welding and Mfg. Co., in West Toledo. A specialty of medium and light weight high-grade iron castings will be made.

**New Blood for Havers**—W. K. Hadley, formerly with the Maxwell Motor Car Co., and more recently with the Marion Motor Car Co., and George Blaitwaite, Stevens-Duryea factory superintendent, have cast their fortunes with the Havers Motor Car

Co. of Port Huron, Mich., in the positions of eastern district manager and factory superintendent, respectively.

**Shaw Joins Red Head Forces**—George E. Shaw has joined the technical staff of the Emil Grossman Co., New York and Detroit, as mechanical engineer.

**Enjoined From Using Name Yale**—Smith-Haines, who sold locks under the name Yale, without being empowered to do so by the Yale & Towne Mfg. Co., of New York, have been enjoined from continuing this practice, by Justice George C. Holt, of the United States district court.

**Shorter Hours for Workmen**—The 10,000 employees of the Willys-Overland Co. and the Kinsey Mfg. Co., a subsidiary concern, of Toledo, O., have been notified that after August 1, 50 hours will constitute a week's work instead of 54 hours. The decrease in working time does not carry any cut in wages.

**Motor Exhibit at Racine**—Of the 120 Racine manufacturing concerns that will exhibit in the first annual "Made-in-Racine" exposition, to be held in the new J. I. Case foundry at Lakeside, Racine, from June 9 to 14, under auspices of the Racine Commercial Club, nearly fifty are manufacturers of and will exhibit motor cars, parts, accessories, bodies, or other articles that have a place in the category of the motor car industry. Until the lists were prepared by the exhibitors' committee and given to the

## Recent Incorporations

**Boston, Mass.**—Multiple Utility Co., capital stock, \$48,000; to manufacture self-starting devices; incorporators, J. C. Burrus, W. J. McGum, W. P. Sawyer.

**Buffalo, N. Y.**—Easy Starter & Speeder Sales Co., capital stock, \$1,000; to manufacture starting devices; incorporators, F. A. Coon, H. J. Schopf, J. E. Schuesler.

**Canton, O.**—Reliable Puncture Seal Co., capital stock, \$25,000; to deal in accessories; incorporators, L. W. Steinmetz, W. V. Baird, P. S. Wise, J. R. Blinn, E. D. Myers.

**Cleveland, O.**—Air-Tank Carburetor Co., capital stock, \$10,000; to manufacture gas generator; incorporators, E. Younger, L. C. Loomis, F. Castle, W. J. Engel, J. Kelly.

**Cleveland, O.**—Auto Cartage Co., capital stock, \$10,000; to deal in motor cars, and conduct delivery business; incorporators, A. E. Bernstein, E. B. Zwirk, S. Selker, M. L. Bernstein, I. Nungesser.

**Cleveland, O.**—Cleveland Ball Bearing Co., capital stock, \$10,000; to manufacture and deal in ball bearings; incorporators, H. Merkel, G. M. Merkel, F. J. Probeck, W. A. Crawford, C. H. Warner.

**Cleveland, O.**—H & H Auto Co., capital stock, \$10,000; to manufacture and deal in motor cars; incorporators, F. M. Fogarty, J. O. Fordyce, A. B. Brackenridge, H. M. Reidel, C. M. Dolan.

**Cincinnati, O.**—K Auto Delivery Co., capital stock, \$10,000; general trucking business; incorporators, E. Konkor, G. W. Bell, A. Konkor, G. Konkor, F. Schmidt.

**Columbus, O.**—Babcock Garage Co., capital stock, \$10,000; to deal in supplies; incorporators, A. G. Duer, C. Wagenhausen, L. P. Wagenhausen.

**New York**—Triumphant Tire Society, capital stock, \$500; to deal in tires; incorporators, E. R. DeTamble, L. Bennett, E. A. Swanson.

**New York**—Asch & Co., capital stock, \$1,000; to conduct motor car business; incorporators, L. Veith, B. M. Asch, W. M. Goldsmith.

**New York**—Lake Sales Co., capital stock, \$25,000; to deal in piston rings; incorporators, H. S. Lake, J. A. Walker, R. B. Wasson.

**New York**—Gadabout Motor Corp., capital stock, \$250,000; to deal in motors and motor cars; incorporators, A. V. Clarke, C. Vail, D. E. Dealy, Jr.

**New York**—Harry S. Houpt, capital stock, \$60,000; to deal in motor cars; incorporators, L. A. Van Patten, I. H. Westervelt, L. W. Bagley.

public, few, if any, Racine natives had imagined that their city stood in the high rank it does in the industry.

**To Make Kerosene Engines**—There is an unconfirmed rumor that Frank and Perry Remy of Anderson, Ind., formerly owners of the Remy Electric Co., expect to engage in the manufacture of kerosene oil engines. They have been engaged in secret experiments for several months and have been negotiating for a factory.

**Cole Doubles Capital Stock**—The Cole Motor Car Co. announces that its capital stock has been increased from \$500,000 to \$1,000,000. The action was taken at a meeting of the Cole stockholders. The meeting also caused the plans of J. J. Cole to double the Cole production figures and to build a large addition to the present Cole factory to be approved.

**Students Inspect Tire Plant**—Members of the senior class in chemistry in the University of Minnesota, on a tour of inspection of the country's representative industries, spent a day recently in the plant and laboratories of the Federal Rubber Mfg. Co. at Cudahy, Milwaukee county. Officers of the Federal company gave a luncheon in honor of the party.

**To Manufacture Flexible Wheel**—Thomas J. Holland, designer and patentee of a new style of flexible wheel for motor cars and trucks, has organized a company at Antigo, Wis., to manufacture and market the wheel. The corporate name is Holland Flexible Auto Wheel Co. and the capital stock is \$10,000. James L. Donahue and John E. McKenna are associated with Holland.

**Maxwell Increases Capital Stock**—Having completed the necessary legal details, controlling interests of the Maxwell Motor Co. have filed notice of an increase in the capitalization of the corporation from \$31,000,000 to \$37,000,000. The \$6,000,000 new shares are equally divided into first and second preferred and common stock, and represent the cost of taking over the Flanders Motor Co.

**1913 Buick Traffic Heavy**—With the 1913 production season on the home stretch and the year's output of 30,000 cars fast becoming a matter of sales record, the Buick Motor Co. gives out a few interesting facts concerning the workings of its traffic department. Fifteen thousand cars were handled in the Buick yards during the year. Outgoing cars numbered 7,600, and incoming freight 8,000 carloads.

**New Tire Company in Field**—The Morgan & Marshall Co-Operative Rubber and Tire Co. of East Liverpool, O., has awarded the contract for a plant, 90 by 107 feet, and the work of construction will be started at once. The company will manufacture motor car and motorcycle tires and druggists' sundries. Dr. R. J. Marshall, mayor of East Liverpool, is president of the company, which is capitalized at \$500,000.

**Lambert Sells Out Interests**—G. A. Lambert and James A. Burk have bought the interests of B. F. Lambert, president of the Buckeye Mfg. Co., Anderson, Ind., which builds Lambert motor cars. They have been interested in the company for some time. B. F. Lambert has bought a controlling interest in the Elwood Iron Works, Elwood, manufacturers of heavy castings and of an oil engine recently perfected by David Morrison, a machinist of Anderson.





# Brief Business Announcements



## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

Town	Agent	Car	Town	Agent	Car
Baltimore, Md.	Coles Motor Sales Co.	Chandler	Little Falls, N. Y.	Frank Burger	Henderson
Battle Creek, Mich.	A-B Stove Co.	Henderson	Logan, O.	Hocking Valley Auto Co.	Detroit
Birmingham, Ala.	A. J. Arrant	Franklin	Marietta, O.	Frederick R. Hall	Standard
Cedar Rapids, Ia.	A. D. Wood	Franklin	Newark, O.	Newark Auto Co.	Regal
Charleston, W. Va.	R. L. Frasier, Jr.	Henderson	Niagara Falls, N. Y.	Mat Walsh	Henderson
Charleston, S. C.	Automobile Repair Co.	Henderson	Oskaloosa, Ia.	Amsberry & Hennessy	Henderson
Chicago	Centaur Motor Co.	R. C. H.	Portland, Ore.	United Auto Co.	Marion
Cleveland, O.	W. E. Warters	Henderson	Richmond, Ind.	W. T. Bradway	Henderson
Circleville, O.	Mader Auto Co.	Regal	Richmond, Va.	L. Casselman, Jr.	Henderson
Hampstead, Md.	R. Snider & Son	Cutting	Satauket, L. I.	A. Pfeifer	Franklin
Haverstraw, N. Y.	John W. Gillies	Franklin	Seattle, Wash.	J. P. Searce and W. Matheson	Metz
Hundred, W. Va.	F. Q. Berdine	Henderson	Waukegan, Ill.	H. L. Beach	Henderson
Huntington, W. Va.	J. A. Tucker	Henderson	York, Pa.	Southern Pennsylvania Auto Co.	Krit
Huntsville, Mo.	M. H. Callahan	Henderson	Youngstown, O.	J. Ralph Seidner	King
Indianapolis, Ind.	C. J. Blumenberg	Maxwell			

### COMMERCIAL CARS

Asbury Park, N. J.	Seacoast Garage Co.	Stewart	Lockport, N. Y.	Charles L. Papworth	Stewart
Boston, Mass.	M. B. M. Co.	Hercules	Los Angeles, Cal.	W. K. Cowan Co.	Jeffery
Hudson, N. Y.	W. P. Petry Garage	Stewart	Providence, R. I.	Edgewood Garage	Stewart
Kingston, N. Y.	Van's Garage	Stewart	Troy, N. Y.	Payne Automobile Co.	Stewart

**NEW YORK, N. Y.**—Splitdorf service stations will be opened at Newark, N. J., and Toronto, Canada, the first of June.

**St. Louis, Mo.**—The St. Louis Tire and Rubber Co. has recently opened a Chicago branch at 2027 Michigan avenue under the direction of Alexander Hendel.

**Boston, Mass.**—W. B. Fewell, for several years manager of the New England branch of the Oldsmobile at Boston, has just resigned and his position has been filled by the appointment of L. G. Dodge.

**Buffalo, N. Y.**—H. Z. White and E. E. Ferger have formed a co-partnership at the Allen Street garage, 138 Allen street, for the repair of motor cars, magnetos, coils and engines.

**Chicago**—The Badt-Westburg Electric Co., 1504 Monadnock block, will represent the Ward Leonard Electric Co. in the sale of electric lighting and starting system for motor cars.

**Cleveland, O.**—The Gilson Starter Co., 1451 Leader-News building, has been incorporated to place on the market in this territory the Gilson starter, manufactured in Indianapolis.

**Buffalo, N. Y.**—The Lumen Bearing Co., Sycamore and Lathrop streets, maker of ball bearings for motor cars, was damaged by fire recently to the extent of \$25,000. Much expensive machinery was destroyed but nevertheless the company is able to transact business.

**Buffalo, N. Y.**—Edward Philip Lettze, under the firm name of the L. X. L. Motor and Engineering Co., who conducts a garage here, has filed a petition in bankruptcy listing liabilities at \$3,855.11, with assets of \$3,411. of which \$2,000 is an insurance policy and \$100 stock in trade.

**Milwaukee, Wis.**—The Economy Motor Fuel Adjusting Co. has been organized at Milwaukee by John McFarland, Max Grass and John J. Handley, with headquarters at 709-711 Chestnut street, to manufacture a new type of carburetor and to act as specialists in the adjustment of carburetors for the motorist generally.

**New York, N. Y.**—The following Bosch service stations recently have been established: W. D. MacMillan, Jr., Wilmington, N. C.; Kinston garage, Kinston, N. C.; Wichita Garage Co., Wichita, Kansas; The Auto Supply Co., Hutchinson, Kansas; Joseph T. Cox, Penn Yan, N. Y.; Cuskaden Auto Supply So., Atlantic City, N. J.; Sev-

erin-Lumbard Tire and Supply Co., Oklahoma City, Okla.; Reed Motor Supply Co., St. Paul, Minn.

**Buffalo, N. Y.**—Clifford B. Haskins has accepted the managership of the retail branch in Buffalo of the Krit Motor Car Co., 1413 Main street.

**Boston, Mass.**—E. P. Weber, who has been manager of the Boston branch of the Walpole Tire Co. ever since that company made its entry into the tire business, has resigned.

**New Haven, Conn.**—The business of the local Moon agency has been transferred to the Bradford-DeBussey garage at 400 Crown street, where permanent quarters will be established.

**Boston, Mass.**—The Universal Motor Truck Co., of Boston, has moved into new quarters in the Fenway garage because the city has taken the land where it was formerly located on Pleasant street, to widen that thoroughfare.

**Boston, Mass.**—Manager Fred Walsh, of the New England branch of the Oakland Motor Car Co., has moved the Boston salesrooms from Boylston street to the old quarters of the United Motors Boston Co., corner of Massachusetts avenue and Newbury street.

**Boston, Mass.**—George H. Mayo, formerly with the Hubmark Rubber Co., is now the manager of the Enterprise Rubber Co. in Boston, taking the place formerly occupied by William E. Barker, who has gone to New York with the U. S. Rubber Co.

**Milwaukee, Wis.**—William Diemann is building a \$10,000 garage and sales building at 725 Greenfield avenue, and will become south side distributor of the Case car, under the direction of the new Milwaukee branch of the J. I. Case T. M. Co., of Racine.

**St. Louis, Mo.**—The J. I. Case T. M. Co. has opened a new service station and sales room at 5074 Delmar boulevard. H. B. Daniels is in charge of the new quarters. W. S. Roberts, the branch house manager, is at the head of the distribution business for the St. Louis territory.

**Philadelphia, Pa.**—The Philadelphia Automobile Athletic Association, composed of representatives of a half dozen of the larger motor car houses, has been organized. The object of the association is to foster healthful recreation for the employees of members and to promote closer trade relationship. The association embraces the following firms: Locomobile Co.; of America, Automobile

Sales Corp., Oakland Motor Co., Buick Motor Co., Foss-Hughes Co. and the Packard Motor Car Co.

**Boston, Mass.**—J. R. Bradford, who has been with the Boston Buick branch for some years, resigned a few days ago.

**Minneapolis, Minn.**—The Todd Mfg. Co., maker of motor car radiators, has leased the upper floors of 820-822-824 Mary place, owing to an increase in business.

**Lima, Ohio**—H. B. Willower, who has for the past 2 years represented the Gramm Motor Truck Co. throughout Illinois, Indiana, Kentucky and Michigan, has joined the sales staff of the Gramm-Bernstein Co.

**Boston, Mass.**—Charles Addison Malley, who was instrumental in forming the M-B-M Co. to handle the Maxwell retail line in Boston, has resigned and the new company is now under the management of E. H. Marsters.

**Kansas City, Mo.**—Nelson A. Gotshall, manager of the Bagnell Automobile Co., has leased as a site for the new Bagnell agency here the building at Fifteenth street and Grand avenue, formerly occupied by the Oldsmobile Co.

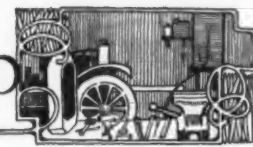
**Milwaukee, Wis.**—Henry O. Stenzel, president of the Milwaukee Tire and Supply Co., 457-459 Milwaukee street, has organized the White Automobile Co. to take the district agency for White cars. Temporary headquarters are in the Tire and Supply building on Milwaukee street, and a garage and salesroom will be leased or erected this year.

**Waupun, Wis.**—Zimmerman & Son, manufacturers of tops, curtains, cushions, etc., and in business for 47 years, have filed a voluntary petition in bankruptcy. The property will be sold June 7 to satisfy the demands of creditors. It is said that the failure of a motor car manufacturing company which owed the Zimmerman concern a large sum for material and finished goods, was the indirect cause of the bankruptcy.

**St. Louis, Mo.**—W. J. Carter, late of the Oldsmobile St. Louis branch, is vice-president of the Velle Motor Co. of Missouri, incorporated recently to handle the Velle car in St. Louis and Missouri. Other officers are: J. A. Level, president; J. R. Level, treasurer; C. F. Swartz, secretary. Plans are being drawn for a three-story fireproof concrete salesroom and garage at Lake and Delmar avenues.



# The Motor Car Repair Shop



## Cast Iron Linings for Brakes

IT is customary in some of the European repairshops to replace the fabric brake linings of cars with cast iron, whenever a request is made to overhaul a set of brakes preparatory to a trip on the continent where long grades are to be encountered. For the benefit of motorists contemplating trips abroad, or in unusually hilly sections of America, a description of the application of cast-iron brake-linings will be of no little value.

Cast iron brake linings generally come in the form of a ring such as is shown at B, Fig. 1. This ring, if for external contracting brake shoes, such as shown at A, should be of a diameter just large enough to permit the rings to slip over the brake-drum easily but snugly. For internal brakes, the ring should slip inside of the drum in a like manner. However, if the rings are too close a fit to slip into or onto the drums, perhaps, even a better contact will be assured, but there should be no great difference between the contacting diameters of the drums and linings, otherwise a poor, gripping contact will be obtained, which will render the brakes quite inefficient for sometime until the linings are worn into shape.

### Fitting of the Shoe

One also should be careful not to use a cast iron ring of too great thickness—about  $\frac{3}{8}$ -inch is the proper thickness in the majority of cases, though one may be guided in this respect by the thickness of the original fabric, if some of its original thickness remains unworn; or one may judge the proper thickness, by holding a shoe concentric with its drum and then measuring the distance between the shoe and drum.

When the cast iron rings of the proper diameter have been obtained the next operation is to try the shoes on the ring as shown at C and learn if they conform to the shape thereof. If the brake linings have previously been badly worn, it generally will be found that they do not conform to the shape of the ring but have been warped more closely to the shape of the drum. As shown at C, the upper shoe has been warped in this manner, whilst the lower one fits the ring very snugly, as it should. The next operation, therefore, is to straighten out the upper shoe a trifle so that it too will fit properly, or in other words, true it up.

The operation of truing up a brake shoe of the type shown in Fig. 1 is illustrated at E, and consists in simply securing the ring in a vise; then heating the brake shoe uniformly in a forge, gas furnace, brazier, or with a torch, to a light, cherry red, then applying it to the ring

## Fitting Iron Brake Lining

as shown, and striking it gently with a hammer, as indicated, until it fits the ring.

One should use the hammer very gently but quickly so as to finish the job before the shoe cools sufficiently to lose its light red color; for when it begins to resume its dark black color, it bends less readily, harder blows are required, and there is danger of fracturing the shoe, and also of bending the ring out of its true circular form. The shoe should then be allowed to cool slowly, and should not be quenched in water. When cool, the rings are ready to be cut to fit the shoes. On transmission brakes, the shoes are apt to be unequal in length, and the lining may be designed to extend farther over one side of the shoe than the other. These conditions must not be ignored in cutting and applying the linings.

If a cast iron ring is too wide, it should be placed in a lathe and cut to the proper width before being cut into sections; otherwise the work becomes very laborious. When this is done, the shoes may again be applied to the ring, the ring marked for cutting into sections of the proper length, then cut with a hack-saw. In cutting with the hacksaw, care should be taken when nearing the end of a cut, so that a section does not drop off; cast iron is very brittle and breaks easily. Caution also is necessary in cutting down the width of the ring in a lathe. The ring should be securely chucked and evenly cut, and the cut should not be too deep.

### Riveting Linings To Shoes

In drilling the rivet holes, and riveting cast iron linings there is a right and a wrong way. The right way is to drill the

first hole as near the center of the shoe as possible, as at 1 or 2 of D, Fig. 1. Then as soon as the first hole is drilled through the lining, a rivet should be placed in it and secured. If the first rivet is placed in the hole 1, then the second should be placed in the hole 2, which is drilled after the first rivet is in place. Then moving from the center outwards towards the ends of the shoe, one should continue drilling and applying the rivets one after another in this manner. The wrong way to start is to begin with a rivet at opposite ends, though it is permissible to begin at either end and proceed, one hole and rivet at a time, toward the other end. This rule applies to all forms of brake linings, and assures a snug fitting lining.

### Drilling the Holes

In drilling the rivet holes, the holes in the shoes generally serve as guides for the small-diameter holes; then to enlarge or counter-sink the holes in the lining to receive the heads of the rivets the shoe is turned over, and a larger diameter drill used or a countersinking tool. The countersunk portion of the hole in the lining should be fairly deep as indicated at F.

For cast iron a deeper hole is generally permissible than for fabric. When the linings have been applied, the finishing operation is to bevel down the ends as at G, this to prevent biting and consequent chattering of the brake, and makes for smooth engagement with the drum. In fitting a set of brake linings it also is advisable to try them occasionally in place before securing the linings to the shoes, this may help to avoid errors in cutting and fitting. A tool T, Fig. 1, which is designed to rest vertically in the jaws of a vise is very handy in the operation of riveting.

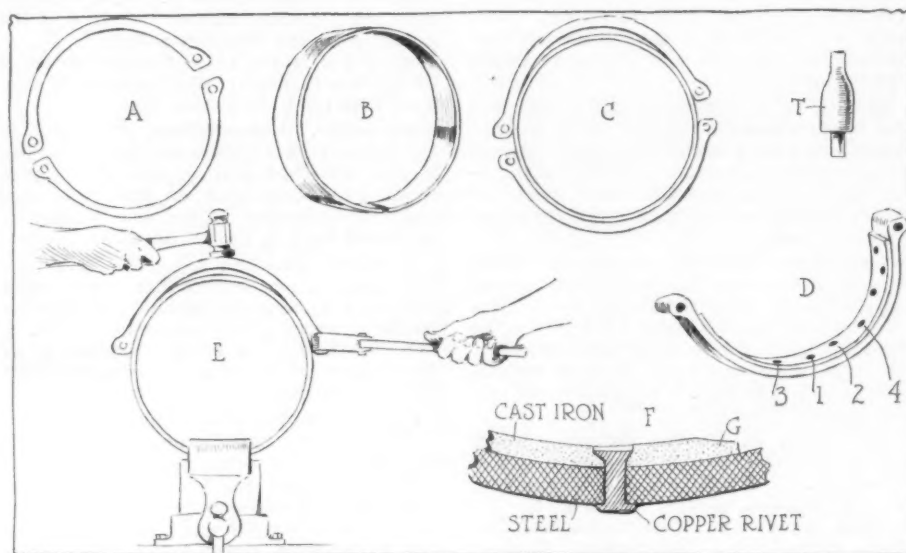


FIG. 1—CAST IRON SHOES AND METHOD OF FITTING



# STROMBERG

## Carburetors

The most severe vibration or the roughest going cannot affect the adjustment of the Stromberg Carburetor

When it leaves the factory, after its final test and inspection, the Stromberg adjustment is perfectly made and so secured that it cannot be altered unless the owner so desires. The adjustment is locked in.

With the ordinary carburetor motorists have a great deal of trouble with carburetor adjustments. An instrument that is set properly in the garage is frequently affected in the first mile of rough travel. Gasoline or air controls are made useless by vibration or road shocks, and the carburetor thereby made inefficient and troublesome.

This defect has been entirely eliminated from the Stromberg. We have installed two simple spring locks that positively prevent adjustment alterations. Our instrument is guaranteed against getting out of adjustment.

Both low and high speed adjustments are provided with these spring locks. The lock is a simple, accessible spring set-screw, the head of which fits snugly into a groove in the side of the adjusting nut. No amount of vibration can dislodge the lock and allow the nut to turn. It cannot be moved unless the driver desires a change of adjustment.

Through this adjustment locking device there is no possibility of having either too rich or too lean a mixture under any condition. You can forget your carburetor adjustment entirely, assured that it will remain the same until you are ready to alter it.

This arrangement is only one of the numerous features which make the Stromberg the most practical and reliable instrument for your car. Our "Reason Why Talks" explain many others. They are free for the asking. Simply send us your name and address and you will receive them, postpaid, by the next mail. Write today.

**Stromberg Motor Devices Company**  
**54 East 25th St., Chicago, Illinois**

### Branches

New York

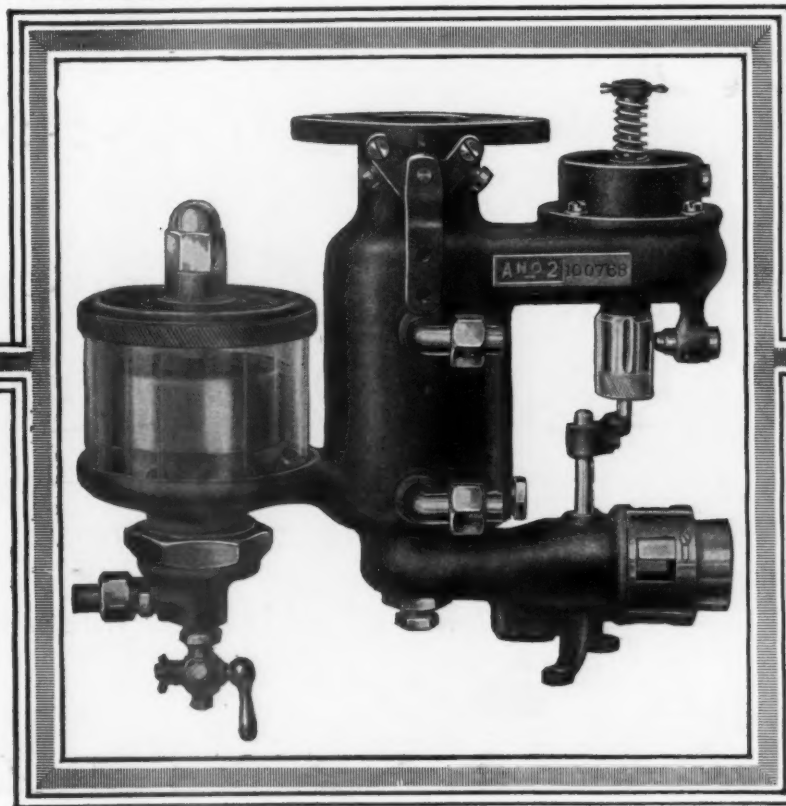
Boston

Detroit

Indianapolis

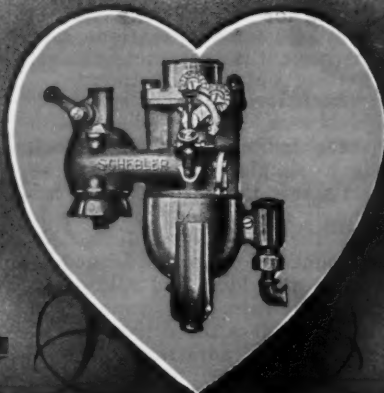
Minneapolis

Pacific Coast Distributors—Chandler and Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle.  
 Canadian Distributors—Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver.



# SCHEBLER

*The Aristocrat  
of Carburetors*



*"The Heart of the Automobile"*

## WHEELER & SCHEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS  
INDIANAPOLIS U.S.A.

### THE SCHEBLER IS THE ACKNOWLEDGED STANDARD CARBURETOR OF THE WORLD

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NEW YORK  
BOSTON  
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SEATTLE  
MONTREAL CAN.  
SIDNEY AUSTRALIA

#### *Service Department*

#### *Distributors*

Every city and town in  
the United States and  
Canada • Europe and  
• Australia •



# Merely Expense

EVERY automobile manufacturer would *like* to equip his car with a more efficient signal than the inadequate, out-of-date bulb horn.

He knows that the trend of automobile building is towards the absolutely complete car—complete with every *standard* accessory that makes for safety and comfort—and that this is what motor car buyers are demanding.

He realizes that every accessory placed on his car should conform to the standard of the car itself.

FIFTY-FIVE of the leading makers—representing every high grade car in America—are Klaxonizing their entire output.

Others are holding back, merely because of the extra expense.

*IS THIS REALLY ECONOMY?*

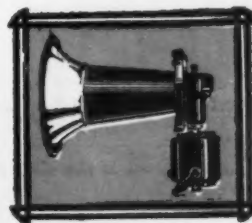


KLAXONET

Lovell-McConnell Mfg. Company Newark, N.J., U.S.A.

## KLAXON

*"The Public Safety Signal"*



KLAXON



Three years of  
desperate strug-  
gles and almost  
100 of the best cars  
have failed to sur-  
pass or even equal the *National*

# National

**The unconquered car**

**National 1912 winner, 78:72 miles per hour**

**Time of 1913 winner, 76:59 miles per hour**

**Time of 1911 winner, 74:61 miles per hour**

**Still holds the world's record for fastest competition 500 miles**

The National won the 500-mile International Sweepstakes Race at Indianapolis Speedway last year, breaking the former record by 4.11 miles per hour. The famous Peugeot car won the 500-mile race this year, 2.13 miles per hour slower than the National. The National was not entered this year.

**Best American and Foreign Built cars fail to  
equal record of National**

The record of the *National* still remains supreme—its reliability, speed, power, dependability, endurance, ease of control, and its high grade material and construction has again been proved beyond the shadow of a doubt.

The best American and Foreign Built cars were unable to surpass or even equal the *National's* record in the world's greatest contest.

**National still Stock Champion**

The *National* still holds the much coveted title of "Stock Champion"—it has actually demonstrated its superiority over all contenders by having won the Stock Championship race at Elgin for cars the same as sold to you.

The *National* car that won the 500-mile race was made almost entirely of stock parts. In addition the *National* also holds the record for the fastest straight-away mile for stock cars—89.28 miles per hour.

**You do not want to buy a racing car**

You do not want to race—no—but you do want a car that has stood the world's most severe test and won out—the superior car—the unconquered car.

The *National* is the choice of the discriminating car owners who have had experience. This is because of its perfection of materials and design; its long

**Five models—\$2750 to \$3400**

stroke motor; left side drive; center control; access to both front doors; roomy comfortable bodies; ease of control; accessibility of parts and its general distinctive appearance and perfect service. It is always to be depended upon, always equal to every emergency; and always the conqueror no matter where you drive. Electric self-starter and electric lights.

**Let us send you our illustrated catalog**

**National Motor Vehicle Company,**

**Indianapolis, Indiana**





## Goodbye To The Good Old Friend

It caused you some pain yet afforded  
you lots of pleasures.

But parting is a "sweet sorrow," in this instance made sweeter by the knowledge that you have escaped with life and sound in limb from the devastating slam of that never-to-be-forgotten crank handle. So here's to the new friend, knowing it can never raise a mailed fist to smite its owner in an unguarded moment, for with the installation of an

## Electric Cranker

OPERATED  
FROM AN



## Storage Battery

the last—the deadliest—element of danger attending the automobile's use has been removed.

## Willard Storage Battery Company CLEVELAND, OHIO

New York Branch: 136 W. 52nd St.  
Detroit Branch: 1191 Woodward Ave.

Indianapolis Branch:  
438 and 439 Indiana Pythian Bldg.

Chicago Branch: 2241 Michigan Ave.  
San Francisco Branch: 243 Monadnock Bldg.

Depots in all Principal Cities in the United States, Canada and Mexico



# HOLLEY CARBURETOR

## In the Whirl of Public Approval

Like a cyclone sweeping across the country, has been the rising popularity of the new self-adjusting Holley carburetor—a mixing device with no moving parts and only one adjustment—the carburetor that has made the best of the Spring and Ball types old-fashioned and out of date.

Never before has any carburetor met with such quick acceptance.

**HOLLEY BROTHERS CO.**

131-141 Rowena Street, Detroit

• AUTOMOBILE SUPPLY CO....1335 Michigan Blvd., Chicago, Ill.  
OMAHA RUBBER CO.....Omaha, Neb.

FOREIGN BRANCH

HOLLEY BROS. CO....Coventry, England

**NO MOVING  
PARTS**

When Writing to Advertisers, Please Mention Motor Age.



# HOLLEY

## CARBURETOR

**Over half the gasoline cars manufactured in the United States for 1913 will be equipped with this new Holley carburetor.**

Over 1,000 are being made and shipped daily, and over 150,000 of them have been sold this year. Inasmuch as the 1913 output is entirely sold, only contracts for 1914 can be made.

1914 models, for demonstration to manufacturers, now ready.  
Please let us have your specifications as early as possible.

Holley Carburetors are carried in stock at the following addresses:  
CHAS. E. MILLER, Home Office: 97-103 Reade St., and 121 Chambers St., New York.

**BRANCHES:**

New York City.....	924 Eighth Ave., Between 54th and 55th Sts.
New York City.....	2782 Broadway, Between 107th and 108th Sts.
Springfield, Mass.....	Bridge and Dwight Sts.
Hartford, Conn.....	274 Trumbull St.
Atlanta, Ga.....	66 Edgewood Ave.
Brooklyn, N. Y.....	1421 Bedford Ave.
Buffalo, N. Y.....	824 Main St.
Albany, N. Y.....	135 Central Ave.
Boston, Mass.....	202-204 Columbus Ave.
Detroit, Mich.....	227-229 Jefferson Ave.
Cleveland, Ohio.....	1820 Euclid Ave.
Philadelphia, Pa.....	318 North Broad St.
New Orleans, La.....	601-603 Baronne St.
Newark, N. J.....	274 Halsey St.

**ONLY ONE  
ADJUSTMENT.**

## Automobile Axles of Known Quality

### *We Have Open Capacity for 1914*

and are in position to handle contracts for the highest grade pleasure car axles for both gas cars and electrics.

On standard cars of several well known makes, Metal Products axles have won a high reputation for long wear, silence, fine workmanship and finish. For the past several years we have built *all* of the axles for two of the best known cars. An investigation will show you that there are no better axles built.

Our pressed steel housing type rears are light in weight, unusually rigid and silent.

We are fully equipped to build to your specifications or furnish standard type. Materials and Workmanship fully guaranteed. *Deliveries as you want them, assured.* Write us before placing your contract.

**Metal Products Company**  
Detroit, Michigan



# RUDGE-WHITWORTH

## DETACHABLE WIRE WHEELS

Fitted with **HOUK** quick  
Detachable  
Rims . . .



### Double Victory for Rudge-Whitworth Wire Wheels In 500 Mile International Race, Indianapolis

Peugeot won first place—Mercer won second, both equipped with RUDGE-WHITWORTH WIRE WHEELS.

That both these cars were equipped with RUDGE-WHITWORTH WIRE WHEELS is an unqualified tribute—unfailing proof—that these wire wheels are the acknowledged leaders in both Europe and America.

The foremost American cars for 1914 will be equipped with RUDGE-WHITWORTH WHEELS fitted with Houk detachable rims.

**GEORGE W. HOUK COMPANY**

5002 Lancaster Avenue

Philadelphia, Pa.

## No-Rim-Cut Tires 10% Oversize

### 11% Less This Year

Rubber has dropped a little. And our factory cost, because of multiplied output, has dropped a little more. Our new factories are completed, and we've equipped them with the latest labor-saving machinery.

Now we have a capacity pretty close to 8,000 motor tires daily.

As a result, No-Rim-Cut tires are costing about 11 per cent less than last year.

#### What You Save

You save, by using these new-type tires, all the ruin of rim-cutting. And that is what wrecks 23 per cent of the old-type clincher tires.

You get extra capacity. No-Rim-Cut tires are 10 per cent larger than the same rated size in clinchers. And that oversize, under average conditions, adds 25 per cent to the tire mileage.

And now you save on price—11 per cent under what these tires cost last year.

#### No Extra Price

No standard tire of any type costs less than No-Rim-Cut tires today.

Hooked-base tires—tires which rim-cut—now cost the same as these new-type tires which don't.

Tires just rated size now cost as much as these oversize tires.

Consider how it pays to insist on these savings when they cost you nothing extra.

#### Their Records

No-Rim-Cut tires, when they cost more than clinchers, came to outsell all others.

The demand for these tires has doubled over and over. It has become the sensation of Tire-dom.

More Goodyear tires were sold last year than in the previous 12 years put together. And car makers alone have contracted this year for 890,680 of them.

Now No-Rim-Cut tires cost no more than old-types, and our demand from users so far this year has jumped 85 per cent.

#### Just Be Fair

All we urge is fairness to your-

self. Test the tires which, on countless cars, have shown the lowest cost per mile.

One glance will show that these tires can't rim-cut, that they are over rated size. Find out how this lowers tire bills.

Hundreds of thousands of men who have done that now use Goodyear tires.

Also be fair to us. For 14 years our experts have worked to lessen tire upkeep. And we are still spending \$100,000 yearly on research and experiment.

Now comes this 11 per cent reduction. Doesn't this record, in your estimation, call for a test of these tires?

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires.

**GOOD YEAR**  
AKRON, OHIO  
**No-Rim-Cut Tires**  
With or Without Non-Skid Treads

### THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio

Branches and Agencies in 103 Principal Cities

More Service Stations Than Any Other Tire

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont.

(1186)



# RAYFIELD

## Carburetor

### Wins International Honors at Indianapolis Motor Speedway

The first American car to finish the 500 mile race was the Rayfield Equipped Mercer driven by Wishart—the second smallest car in the race.

Three other cars equipped with **RAYFIELDS** took prize money.

Bob Burman, after running 57 laps of the race with another make carburetor, changed to a **RAYFIELD** at the pits and made the fastest lap (unofficial).

No **RAYFIELD EQUIPPED** cars had carburetor trouble.

**RAYFIELD EQUIPPED** Cars made the fastest laps of the race against a field of 27 of the fleetest European and American speed creations—once again demonstrating the ability of the **RAYFIELD** to withstand the racking grind of the speedway as superlatively as it copes with the **ECONOMY** and **EFFICIENCY** requirements of everyday service.

A **RAYFIELD CARBURETOR** is the best car tonic. You never know what your engine is capable of doing until you have it equipped with a **RAYFIELD**. Prove this to your own satisfaction by taking advantage of our 30-day free trial offer. Write for full particulars.

**Findeisen & Kropf Manufacturing Co., Chicago, Ill.**

Branches—1140 Michigan Avenue, Chicago;

997 Woodward Avenue, Detroit

1902 Broadway, New York

DISTRIBUTORS IN ALL LEADING CITIES

# Note the Guarantee

## Backed by These Service Stations

Every New Jones Speedometer is backed by this guarantee—**general satisfaction**. We know what the New Jones is capable of—we know how it is built—we know that it indicates the right speed in summer and winter weather—so we guarantee it, without reserve, to give every owner **satisfaction**.

### Branches and Agencies Everywhere

Jones Service Stations, to back up the guarantee, are located in all of the world's principal cities.

Trained men of the highest type are in charge, ready and able to carry out every obligation.

No owner will ever be allowed to regret that he placed a Jones instrument on his car. Every man will be treated with department-store courtesy, as if he were a regular customer. If your selling policy is framed on these lines, don't you want the speedometer you use to be backed by a policy that is similar?

### But Every Jones Is a Master Instrument

We forestall every chance of dissatisfaction, so

far as that is possible, in every Jones instrument turned out. Our facilities permit perfect instruments to be made in lots of ten or ten thousand—every instrument is built and tested as if it were the only one in the factory. Each is a master instrument. Each is accurate, summer and winter, without the use of a compensator.

And that means that even the least expensive of the Jones line is accurate.

# The New Jones Speedometer

### Please Make an Appointment

Please let us know a day and time when you can talk to a Jones representative. We have a man whom we want to send to you to show you the

New Jones in every detail. He has all that you want to know at his finger tips. He knows every speedometer on the market and just how each is made. He has some Jones facts that you ought to know before you make your equipment contracts. Let him give you the Jones proposition as it applies to your particular needs.

Please write us now and name a convenient day.

## The Jones Speedometer, Broadway at 76th Street, New York City

### BRANCHES

New York, Broadway at 76th St.  
Boston, 109 Massachusetts Ave.  
Philadelphia, 1427 Vine St.  
Chicago, 1430 Michigan Ave.  
Baltimore, 217 W. Saratoga St.

Detroit, 872 Woodward Ave.  
Buffalo, 20 Goodrich St.  
Pittsburgh, 5904 Penn. Ave.  
Cleveland, 1845 Euclid Ave.  
Charlotte, 209 Church St.  
Memphis, Madison Ave. and 4th St.

Minneapolis, 800 Hennepin Ave.  
Omaha, 1608 Harney St.  
San Francisco, 1436 Van Ness Ave.  
Los Angeles, 508 W. Pico St.  
Portland, Ore., 71 Seventh St.  
Seattle, 1710 Broadway

Indianapolis, 1201 State Life Bldg.  
Atlanta, 35 N. Pryor St.  
New Orleans, Barrone and Perdido Sts.  
Birmingham, 18 S. 20th St.  
Denver, 1600 Broadway

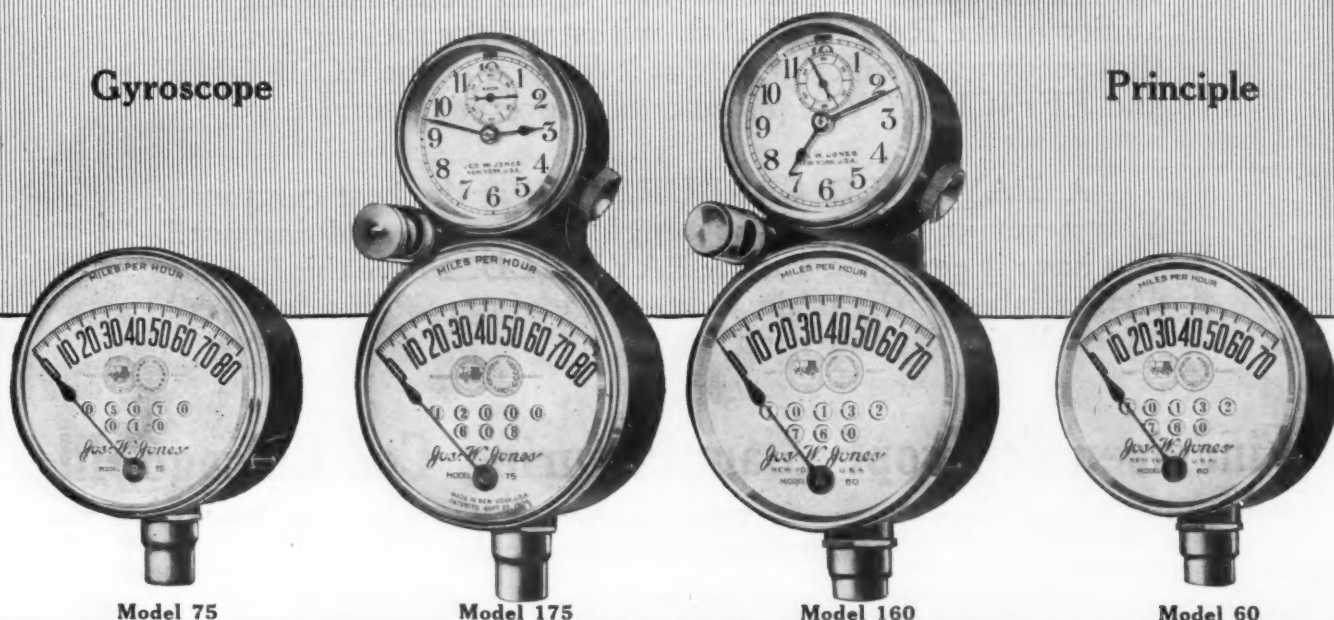
### FOREIGN AGENCIES

J. Millen & Son, Ltd., Montreal, Toronto, Winnipeg, Vancouver  
Markt & Co. (London), Ltd., London  
Markt & Co., Hamburg, Milan, Vienna, Barcelona  
A. A. Kampfraath (Brussels), Ltd., Brussels, Amsterdam  
Severin & Co., St. Petersburg  
G. Bruggemann, Moscow Y. D. Rose, Paris

William D. Easy & Co., Sydney, Australia  
The Tarrant Motor Co., Melbourne, Australia  
C. E. Helvie, Manila, P. I.  
Adams, Ltd., Christchurch, New Zealand  
Markt & Schaefer Co., Rio de Janeiro, Brazil; Buenos Aires, Argentine; Mexico City, Mex.; Habana, Cuba; San Juan, P. R.

Gyroscope

Principle



When Writing to Advertisers, Please Mention Motor Age.



# Heal That Tire Cut ---Now

Don't wait until it has admitted sand and stones that will loosen the tread from the body, form sand blisters and cause blow-outs—use Narco Tire Cut Filler *now*. This "stitch in time" will save your tires for many an added mile. Adds 30 per cent to tire life.



## NARCO TIRE CUT FILLER



### Heals Tire Cuts

a self-vulcanizing, non-inflammable compound, heavy in rubber, a combination rubber cement, cut filler and mastic. Fills the holes, welds the loosened tread to the canvas body and unites the torn parts of the tire with a permanent plug of rubber, as resilient as the tire itself.

Comes in convenient, collapsible tubes with tapering spout. Easy to use—heals over night and *becomes like a part of the tire.*

### Your Dealer

will supply you. Large tube, \$1.00; in Canada, \$1.50. Or, if your dealer can't supply you, fill out and mail us the coupon below.

### Dealers—Read This!!

This advertisement shows what we are doing to teach auto owners the advantages derived from using Tire Cut Filler and other Narco Products. We are running similar advertisements in other high class, standard magazines of general circulation.

**And, Most Important**—the goods back up every word of the advertising. Every tube of Tire Cut Filler sold means a permanent customer. Begin getting your share of Narco profits now. Write for information about prices, dealer helps, etc., to-day.

**NATIONAL RUBBER COMPANY, 4411 Papin St., St. Louis, Mo.**

#### COUPON

National Rubber Co., 4411 Papin Street, St. Louis, Mo.  
Gentlemen:—Enclosed find \$1.00 (\$1.50 in Canada) for which please send me pre-paid a large tube of **NARCO TIRE CUT FILLER**. Also please send complete information about Tirenew and your other Narco Products.

Dealer's name \_\_\_\_\_

Jobber's name \_\_\_\_\_

Address \_\_\_\_\_

My name \_\_\_\_\_

Address \_\_\_\_\_

*When Writing to Advertisers, Please Mention Motor Age.*



## We Have a Message of Red-Hot Interest to Three Classes of Dealers

1. Established dealers selling cars at \$1200 to \$2200 who are having trouble and losing sales because of poor deliveries.

2. Dealers selling high or low-priced cars—or both—who feel the need of a medium-priced car to fill out their line.

3. New blood—energetic, responsible men who contemplate entering the automobile business and who are looking for a dependable, saleable car as the foundation-stone of success.

We want every such dealer to read and study carefully the specifications and construction details of the Tribune, shown on the opposite page.

We have a mighty interesting sales proposition to make to a limited number of dealers—the best possible men we can reach. And limited *means* just that—for every Tribune car that goes out is going to be a hundred per cent right. Big production is going to take second place to *right* production.

“New car”—you say? Nonsense. The name may be new, but you—and your customers—know every item that goes into the car just as well as they know anything. Read the list over again. Motor, axles, transmission—every operating part is standard—by the best makers in the industry.

Write—better still, wire. Best of all, come and get a demonstration. This is an opportunity that doesn't often come.

Deliveries July 1st. But we're closing up with dealers every day. And we won't increase our output by a single car.

Once again, act.

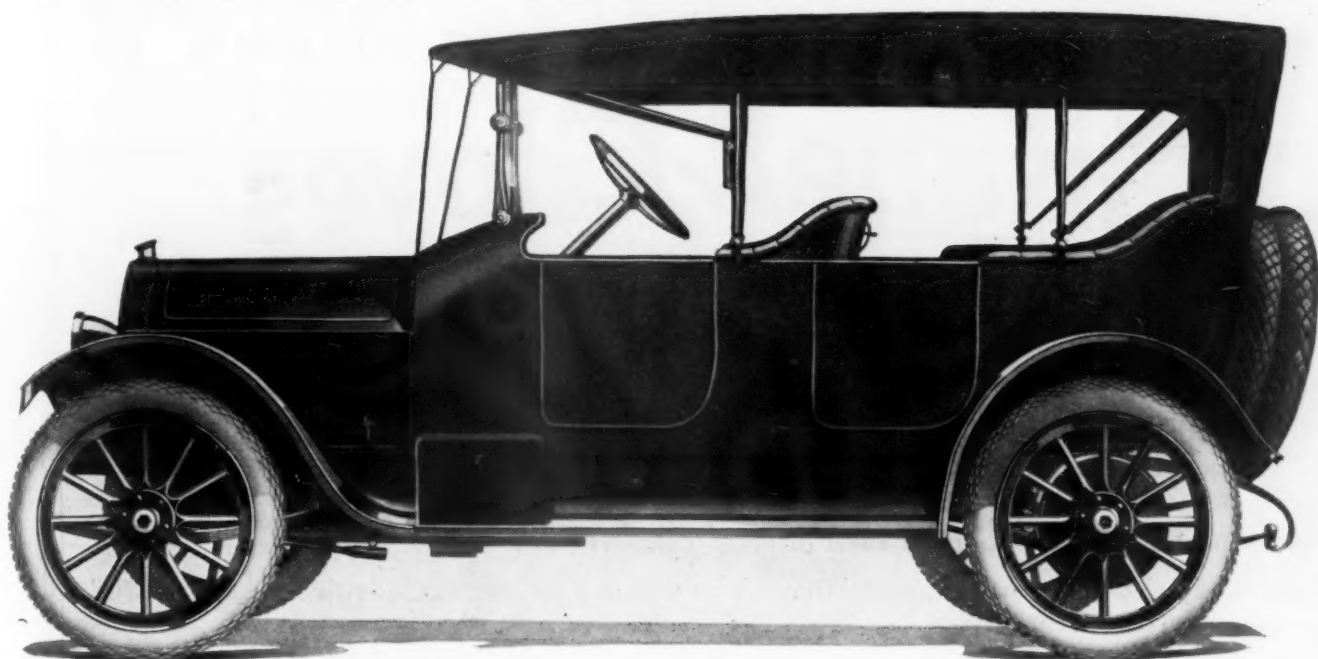


### Tribune Motor Company

807 Scotten Avenue,

Detroit, Mich.





## Tribune "36"

116-inch wheel base, 36 h. p. long stroke motor, 3 3/4-inch bore, 5 1/2-inch stroke, multiple disc clutch, electric lighting, electric self-starter, unit power plant, 34 x 4-inch tires, left side drive, center control, full equipment.

**\$1600** F. O. B. Detroit

### Read Every Word of These Specifications—They're Worth It

**Motor.** The motor is a special L-type, four-cylinder en bloc, three-point suspended, 3 3/4-inch bore, with 5 1/2-inch stroke (243 cubic inches displacement), giving 36 brake horse-power at 1500 r. p. m. It has a three-bearing crankshaft with long, light pistons and exceptionally long connecting rods. Lubrication is by force feed, constant level splash system. A short intake manifold is employed and the valves are large, 1 1/4 in the clear, 5-16 lift. The connecting rods and pistons can be pulled out by merely removing the oil pan and connecting rod caps, making it unnecessary to remove the block or crankshaft. Both crankcase and oil pan are of aluminum, and a bell housing to accommodate the multiple disc clutch is cast one-half integral with the crankcase and one-half integral with the oil pan. The motor is handsomely finished, valve cover plates being nickel plated, cylinders enameled black and crank-case neatly finished. Intake and exhaust valves are at the right side, magneto at the left.

**Axles.** Timken front and rear axles are used. Rear axle is full floating with 5-pitch bevel gear and pinion. Gear ratios are as follows: First speed, 13 to 1; second speed, 6 1/2 to 1; high speed, 3 11-13 to 1; reverse, 15 1/4 to 1.

**Brakes.** Two sets of brakes, external contracting, operated with adjustable foot pedal, and internal expanding, operated with a ratchet hand brake. Brakes are lined with raybestos. There is 320 inches of braking surface, brakes being 14 inches in diameter and 2 inches wide.

**Clutch.** Multiple disc, lined with raybestos, which can be run either in oil or dry, operated by adjustable foot pedal. A ball bearing throwout is provided. To run in oil, plug hole in bottom of housing in crank case.

**Ignition.** Bosch high tension magneto, dual type, with Bosch type spark plugs.

**Colors.** Standard finish, dark blue body; black wheels, fender and hood.

**Speedometer.** Corbin-Brown 10,000 mile speedometer with clock and electric light.

**Carburetor.** Tribune special type. Can be taken apart and inspected with motor running. Simplest, most economical and most efficient carburetor made.

**Starter.** Entz electric starter and lighting unit with special 12 volt storage battery.

An Entz unit will run a Tribune 4 miles on a fully charged battery. Electric unit acts as starter on low speeds and as generator on high speeds.

**Frame.** Single drop, channel steel, with three cross members, reinforced by gussets integral with cross members.

**Transmission.** A Brown & Lipe transmission is used, having 3 speeds forward and reverse, 6-8 pitch gears, Timken bearings, aluminum case. Chrome nickel steel is used in both gears and shafts.

**Lubrication.** Force feed, constant level splash system. All spring bolts, radius rod bolts and torque arm bolts are of the Bowen patented type, having a grease cup which forces grease through a hollow core in the bolt to the wearing surface.

**Steering Gear.** The steering wheel is located at the left side. A Universal type B unit is employed, having a worm and gear with ball bearings. Spark and throttle control levers are nickel plated, steering column being black enameled, spider polished aluminum. Steering column bracket is attached to the toe board. Steering wheel diameter, 18 inches.

**Control.** Ball capped lever, change gear and hand brake bracket being attached direct to the transmission case. The brake lever is ratcheted and operates on the internal brakes on rear wheels through an equalizer.

**Springs.** Semi-elliptic front springs have 7 leaves and are 37 inches long and 2 inches wide. Rear springs are full elliptic, 8 leaves with single scroll in rear. Rear spring is 42 inches long and 2 inches wide, and is hung directly under frame rear cross member, being underslung on the axle by means of a two-piece swivel seat.

**Wheels and Tires.** Wheels are of best second growth hickory, having 1 1/2-inch spokes, twelve spokes and 6 bolts in hub flanges on both front and rear wheels. Tires 34 x 4, non-skid type. Wire wheels will be supplied for \$50 extra.

**Top.** Best grade of Mohair, four-bow, held in place while up by means of vertical straps attached to body. Top is exceptionally wide, having 60-inch bows and has flap in visor which covers the top of the windshield, absolutely excluding rain, snow or dust. A type of curtains are provided which can be rolled up or down from within in case of sudden storm.

**Fenders.** By having the lines of the front fenders follow the contour of the front wheels to the junction with the running boards, easier access to the motor, carburetor and magneto is made possible. Running boards are of wood, covered with linoleum and aluminum trimmed.

**Lights.** Electric, front lights having a diameter of 10 inches, bullet type. Headlights are provided with 16 c. p. bulbs for country driving, while 6 c. p. bulbs are used for city driving, this arrangement doing away with sidelights. Current is furnished for lighting from battery, charged by generator.

**Windshield.** Clear vision, rain vision, ventilating type, water tight and equipped with positive lock.

**Upholstering.** Deep, comfortable, Turkish cushions. Front floor covered with linoleum, aluminum trimmed. Tonneau is covered with carpet which extends to a height of about 6 inches above the floor. Back of rear seat covered with leather, with pocket.

**Gasoline tank.** The main gasoline tank is located under the front seat and has a capacity of 12 gallons. An emergency tank with a capacity of 12 gallons is located under the cowl.

**Equipment.** Top, top cover, windshield, curtains, speedometer, electric lights, robe rail, foot rail, electric horn, jack, tool kit, tire repair kit, pump, extra rim and double holder.

**Bearings.** All anti-friction bearings used in construction are Timken bearings, excepting pilot bearings on clutch shaft, which is a 205 annular ball bearing.

**Radiator.** Tubular type with honeycomb front. Radiator capacity, 4 1/2 gallons. The removable jacket of the Tribune radiator greatly facilitates repairs.

**Weight.** The weight of the Tribune, ready for the road, is less than 2,800 pounds—from 500 to 1,300 pounds lighter than other cars of similar size, equipment and horse-power. With a motor developing 36 horse-power at 1,500 r.p.m., the Tribune will do the work of a car weighing 3,400 pounds and equipped with a 40 horse-power motor. The Tribune, therefore, is much better adapted for hill climbing and heavy going, and is especially recommended for localities where these conditions obtain.



**Tribune Motor Co.** 807 Scotten Avenue, Detroit, Mich.

When Writing to Advertisers, Please Mention Motor Age.

**Yes, Sir! No other gloves are so good as**

# Grinnell-Gloves

*Sold with a Bond*

Made of specially tanned velvet coltskin, so soft and pliable as to permit your making delicate mechanical adjustments, yet tough as rawhide, outwearing several ordinary pairs. Guaranteed not to crack, peel, shrink or harden with use. Washable in soap and water or gasoline. Dry out soft as new.

*Grinnell gloves can be had with such original comfort features as—*

**Ventilated Backs**—tiny perforations that let in cooling air, yet exclude dust. Means hand comfort in hottest weather.

**Rist-Fit**—a strap at the wrist with a V of soft leather in the cuff which can be drawn up, giving a snug, tailored effect and holding the gauntlet back in place. **Grip-Tite**—described below.

The famous  
Grinnell

**"Grip-  
Tite"**

**Style 4827**

with non-slip, corrugated double palm and thumb, giving twice usual wear and affording firm, comfortable grip on wheel or handle-bars. Stands the wear of constant, hard driving, ends hand soreness and makes steering easy.

Whether you motor, golf, hunt, fish, require street gloves or gloves for heavy work, you will find there is a Grinnell Glove made especially for your purpose, and made with extreme care in every detail.

Most good dealers everywhere carry Grinnell Gloves, but if yours doesn't, send us his name and your size, and have us either send you our handsome glove book or a pair on approval, charges prepaid.

**Morrison-Ricker Mfg. Co.**

*Established 1856*

**64 Broad Street**

**GRINNELL,  
IOWA**

**COUPON**

**Morrison-Ricker Mfg. Co.  
64 Broad St.  
GRINNELL, IOWA**

My dealer does not carry Grinnell  
Gloves. My dealer's

Name .....

His Address .....

My Name .....

My Address .....

**Send me your handsome glove book free.  
Also pair Grinnell Gloves on approval, prepaid.**

My size .....

I want gloves for .....

**Don't Delay  
Sending  
Coupon**





# TRACTION TREAD NON-SKID TIRES

*"Tires That Take Double The Wear With Half The Tear"*

THE rubber composition from which these tires are moulded—a formula determined only after years of most searching experiment—has no superior for DURABILITY. TRACTION TREAD Casings, down to the last thin tissue, hang together with as great tenacity as if the rubber were **wired**. That is one reason TRACTION TREAD TIRES consistently give thousands of miles more service than their mileage guarantee promises.

The fabric of TRACTION TREAD TIRES is of special construction, enabling the fabric to undergo stresses and strains many times greater than those met with in everyday service.

The tread of this tire is of special design. The projections are long and flat and will not readily chip. They are self-cleaning and so constructed as not to break the fabric. See this upkeep reducing tire at your dealer's today.

## "The Tire With The Alligator Hide And The Velvet Glide"



INDIANA RUBBER PRODUCTS also include WABASH and INDIANA Tires, Inner Tubes, Inner Liners, Inner Sleeves and Outer Boots, every one of which is guaranteed to give perfect service satisfaction.

The Traction Tread—the Firm Tread.

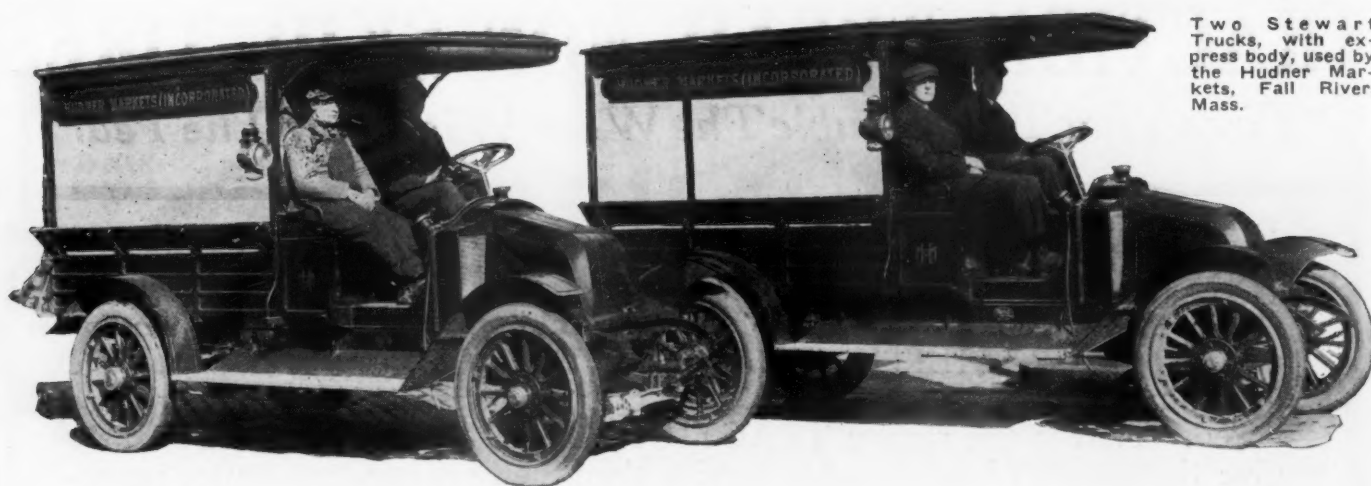
Write for catalog.

**Indiana Rubber &  
Insulated Wire Co.  
Jonesboro, Ind.**

CHICAGO REPRESENTATIVES:  
K. FRANKLIN PETERSON  
H. V. GREENWOOD  
122 S. Michigan Boulevard

EASTERN REPRESENTATIVE:  
GEO. R. HALL  
22 Imlay Street.....Hartford, Conn.





Two Stewart Trucks, with express body, used by the Hudner Markets, Fall River, Mass.

Continental Motor  
30 h. p. 3  $\frac{3}{4}$ " x 5  $\frac{1}{4}$ "  
Bosch Magneto  
Timken Axles  
Brown-Lipe Transmission  
Genuine Honeycomb Radiator

## Stewart

### Delivery Trucks

Demountable Rims  
35" x 4  $\frac{1}{2}$ " Tires  
Left-hand Steer  
7 ft. Loading Space  
Bodies of all styles  
Chassis price, \$1650

Stewart Delivery Trucks are now in operation in 42 lines of business in 56 cities in the United States, Canada and South America—and we do not know of a single dissatisfied user.

Some of the largest and liveliest concerns have purchased our Trucks and are rapidly sending in repeat orders. This partial list of some recent sales indicates the big and diversified demand that exists for such a delivery truck as the Stewart.

New York Telephone Co. (9 Stewarts); Taylor Ice Cream Co., Buffalo (6); U. S. Post Office, Washington (10); Hudner Markets, Fall River, Mass. (2); Keer's Lunch Rooms, Philadelphia South Park Commission, Chicago (2); Matthews-Laing Co., Meats, Ottawa, Ont.; Mnfrs. & Traders Bank, Buffalo; L. W. Killeen, Cigars, Schenectady, N. Y.; Emerson

Bros., Furniture, Brattleboro, Vt. (2); Magnus Beck Brewing Co., Buffalo; Sibley, Lindsay & Curr, Dept. Store, Rochester; Caesar's Express, Pittsfield, Mass.; Diamond Laundry, Los Angeles (2); Mongeau & Frere, Groceries, Montreal; Wise Furnace Co., Akron, O.; Buffalo Courier, Newspaper, Buffalo; Rapid Transit St. Ry., Edmonton, Alta.

These Stewart Trucks are making such a great success because they have been planned and built with the single idea of meeting the merchant's needs. They will give service for years.

Wise merchants are learning that it pays to buy good trucks—like the Stewart. Many who have tried cheap trucks and rebuilt touring cars have learned their lesson and are turning now to the real delivery truck, designed and built for severe delivery service.

Merchants tell us that the Stewart is just what they have been waiting for. Write for our catalog and, if you are looking for a money-making sales proposition, send for our dealers' literature.

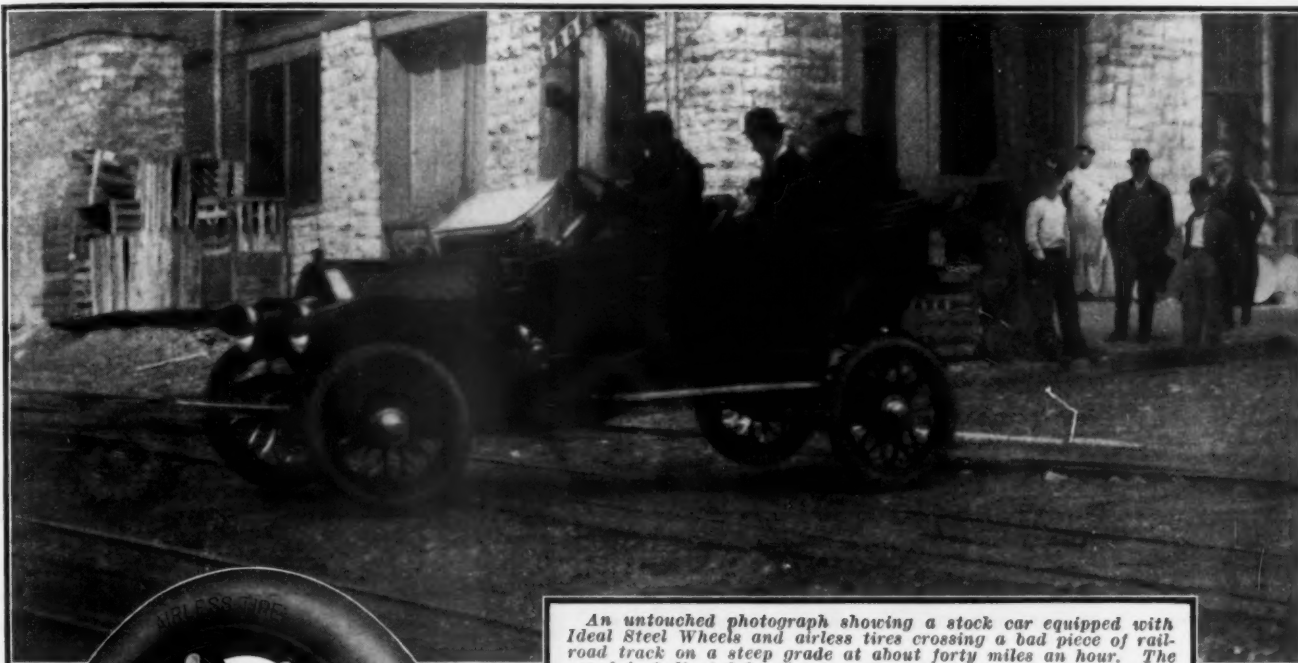
## Stewart Motor Corporation, Buffalo, N. Y.

Two of the six Stewarts, with special panel body, used by the Taylor Ice Cream Co., Buffalo.

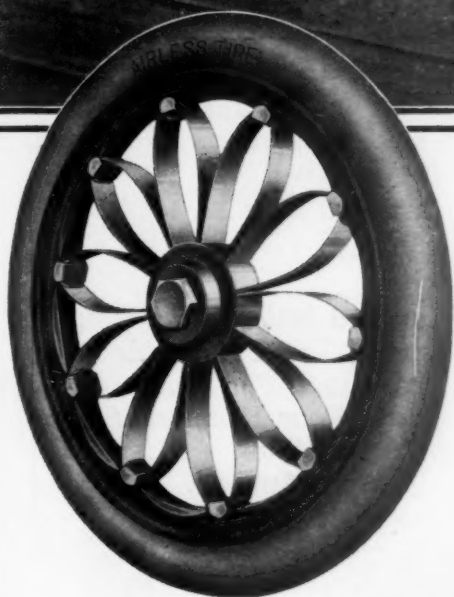


When Writing to Advertisers, Please Mention Motor Age.





An untouched photograph showing a stock car equipped with Ideal Steel Wheels and airless tires crossing a bad piece of railroad track on a steep grade at about forty miles an hour. The speed is indicated by the fact that three wheels are in the air, yet the car suffered no injury owing to the fact that the wheels absorbed all the force of the shock.



## Our claims have been, and are, very radical

**T**O MANY people they have seemed too good to be true. For example, when we say that Ideal Steel Wheels *will double the life of any set of tires*, whether pneumatic or airless, many good people look skeptical. When we declare that a set of these wheels will enable you to do away with pneumatic tires altogether, and still have as easy a riding car using less power, with less wear and tear to car and tires, and less cost per mile, some doubting Thomases say: "You will have to show us." In order to *show* you exactly what the



is and what it will do we have opened several sales offices in different cities where we will be pleased to place at the disposal of every automobile owner a demonstrator car equipped with Ideal Steel Wheels.

We will leave it entirely to you to decide whether the Ideal Steel Wheels do not make as easy a riding car as you ever rode in. *We will subject these wheels to a series of tests that would be impossible with other wheels,—tests of jumping obstructions, negotiating roads that you would*

*never risk in your car with wooden wheels and pneumatic tires, etc. You shall be sole judge.*

Then, if you say so we will equip your car with a set of these wheels without disturbing your present equipment as our wheels can be slipped right on your present hubs in the space now occupied by your wood spokes. You can run your car on our wheels for a week, subjecting them to every conceivable test. If you then decide that you don't want to keep them we will take them back, replacing your wood wheels. The experiment will not cost you a cent.

Where we have no agency we will be pleased to extend our service direct from the home office.

Mention name of your car, model, capacity, etc. Address

**THE IDEAL STEEL WHEEL CO., 1079 First National Bank Bldg., Cincinnati**  
or **THE IDEAL STEEL WHEEL AGENCY, Dept. D,**

in any of the following cities:

**PHILADELPHIA, 506 N. Broad St. CHICAGO, 1166 Diversey Parkway INDIANAPOLIS, N. Capitol St. ST. LOUIS, 3947 Westminster Pl.**  
**DETROIT NEW YORK WASHINGTON CLEVELAND**

Garage owners and Automobile supply owners, communicate with nearest sales office for subagency in your vicinity.

# BRAENDER TIRES



## Go 500 Miles In Indianapolis Race Without Change



(COPY OF TELEGRAM)

Indianapolis, Indiana, May 30, 1913.

Braender Rubber & Tire Co.,  
1987 Broadway, New York.

Finished Seventh Place In The Five Hundred Mile Indianapolis Speed Race Using Braender Tires. Running The Five Hundred Miles Without Single Change. They Look Good For Five Hundred Miles More. Was In Second Place At Four Hundred And Forty Miles When Encountered Trouble in Gasoline.

Ralph Mulford.  
12:50 A. M. May 31.

**T**HE four original BRAENDER TIRES which started the race on Ralph Mulford's Mercedes, No. 29, were never changed. They withstood the terrific strain for the entire 500 miles.

This is absolutely an unprecedented performance and establishes

## A World's Record

for tire endurance. Every motor car owner should investigate BRAENDER TIRES.

4000 Miles Guaranteed

## Braender Rubber & Tire Company

Main Office and Factory Rutherford, N. J.

New York, 1987 Broadway

Brooklyn, 1211 Bedford Ave.

AGENCIES IN PRINCIPAL CITIES

*When Writing to Advertisers, Please Mention Motor Age.*



## 75,000 Continental Motors Develop 3,000,000 H.P. Daily

Enough power if properly applied to lift the Woolworth building, New York—the tallest in the world—396 feet above the pavement in just one minute.

Inconceivable as this feat may appear it aptly illustrates the tremendous energy generated daily by Continental motors in doing the world's work.

These famous motors are driving 75,000 motor vehicles—automobiles, trucks and tractors—on every highway and byway of the country.

They are turning the wheels of progress—swiftly and surely—along the channels of business activity.

### A Factor for Sales and Service

More than fifty manufacturers in the motor vehicle industry are using Continental power for their product—building with a firm foundation for the competition coming.

They know the Continental prestige for sales and service—how it guarantees the worth of the chassis in which it is placed—radiates confidence—and is already “sold” to the buyer. And they are “cashing in.”

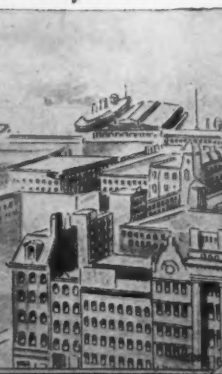
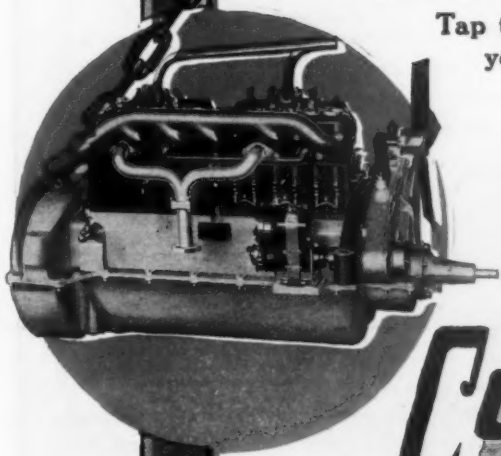
Continental motors have built up more motor vehicle reputations of merit than any other single factor. Backed by ten years of motor building—utilizing the combined experience of a hundred engineers—building in the largest exclusive motor plants in the world.—Continental motors dominate the trade through Quality and Sterling Merit.

Tap this tremendous force of power and prestige for your cars—use Continental energy.

**Continental Motor Mfg. Co., Detroit, Mich.**

FACTORIES—  
Detroit and  
Muskegon, Michigan.

# Continental



# CASE FORTY

Having Saved Where Others Must Spend,  
We Can Spend Where Others Must Save!



The car-buyer pays for the car he buys—and *all that is in it*. He can't separate the good from the bad; he must buy the thing as a unit—in *its entirety*.

The selling-cost of most cars is a considerable item and must, of necessity, be borne by the purchaser.

Every dollar of *Overage* that you pay here, *must* come out of the *vital* values in your car.

## 70 Years to Make These Savings

We spent seventy years in building up our immense organization of 65 Branch Houses and 11,000 Dealers in every part of United States, Canada, South America and Europe. This was done before the first Case Car was made. So our expense for sales and distribution has been a negligible item from the very first. And thus we save many, many dollars in each car we build.

## We Put These Savings in the Car

What we thus save, we invest in superlative materials and workmanship in the car itself—*hidden* qualities, though no less *vital* because they do not show. This *overage* value keeps Case Cars young and responsive when other cars begin to break.

In every car we build we spend several hundred dollars that might be saved. And this is money

that adds nothing to our car's "face value." But we who have built dependable machinery for your father and your father's father know that mere "face values" in a product bearing the Case Eagle will never do.

## Why We Spend What We Might Save

We put the utmost of real quality and refinement into Case Cars, for most are sold to customers who have dealt with us before and who will buy of us again. A promise of 70 long years' standing and the word of a \$40,000,000 concern are here at stake.

Consider, when you buy your next car, that you must take the maker's word for much of what you buy. Either heavy selling costs or else unusually good value lies hidden beneath the surface of the car you purchase. The question is, whose word can you afford to take?

## Hidden Values, or Hidden Profits?

Ponder the logic of *our* argument; judge the ring-true-ity of *our* position, as we have stated it. Then decide if you cannot accept the 70-year-old pledge of Case integrity as *your final guarantee!*

Look up the Case dealer and ask to see both Case Cars. The Case "30" at \$1,500 and the Case "40" at \$2,200 are worth examining. Their values are unique!

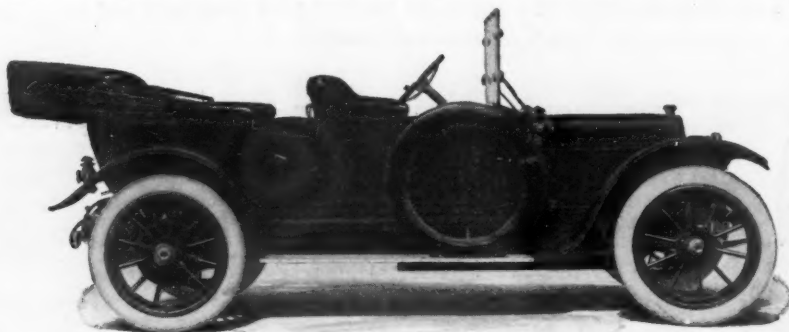
Write today for latest catalog.

## CASE FORTY

### The Car With the Famous Engine

Westinghouse Electric Starter; Westinghouse Electric Lighting System for all Lamps; Side and Tail Lamps, Combination Oil and Electric; Warner Auto-Meter; Electric Horn; Rain Vision Ventilating Windshield; English Mohair Top, Side Curtains and Cover; 37 x 4 1/2-inch Tires; Firestone Universal Quick-Detachable Demountable Rims; 124-inch Wheel Base; Three-Quarter Elliptic Springs; 4 1/2 x 5 1/4-inch Cylinders; Brown-Lipe Transmission; Timken Full Floating Axle; Rayfield Carburetor with Dash Adjustment; Bosch Magneto; Dual System Single Point Ignition. The usual Tools, Tire Repair Kit, Jack, etc. And in addition, Extra Tire and Tube on Rim, Extra Tube separate, Tire Cover, Tire Chains and Handy Work Light on Long Wire.

5-Passenger Touring,  
Fully Equipped, \$2,200



J. I. CASE T. M. COMPANY, Inc., 605 Liberty Street, RACINE, WIS.

Case Cars are sold through 65 Branch Houses and 11,000 Dealers in the United States, Canada, South America and Europe

(162)



# Rich Tungsten Valves

## save 20 to 30% on Fuel Bills



**R**ICH Tungsten Valves actually save from 20 to 30% of fuel over engines equipped with ordinary valves. Make  $\frac{3}{4}$  of a gallon of gasoline do the work of a gallon. In cars averaging but 35 miles a day, at the present prices of gasoline, Tungsten Valves save from \$50 to \$75 a year—many times the cost of a complete set of valves. Furthermore, Tungsten Valves save all regrinding expenses and loss of car service because Rich Tungsten Valves

### Never Need Regrinding

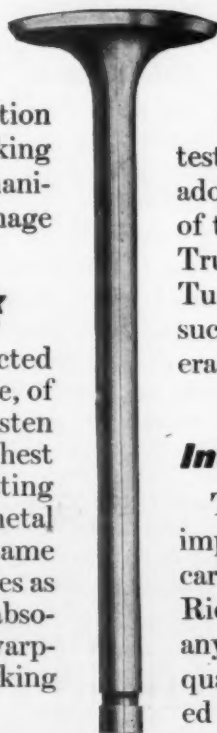
They absolutely do away with imperfect seating of valves with its attendant poor compression, waste of fuel, accumulation of carbon and impaired efficiency of sparking device, back-firing through intake into manifold, with frequent interference and damage to carburetor.

#### Will Not Pitt, Warp or Leak

Rich Tungsten Valves are absolutely unaffected by heat up to 1700° and are made in one piece, of a dense, tough tungsten alloy steel—the toughest and best heat-resisting metal known. The metal in the stem has the same heat resisting qualities as that in the head, absolutely preventing warping, burning or breaking off of stems.



Condition of Valve Made of Cast Iron Used Less Than 200 Miles. Note the Pitting.



Pat. Jan. 28, 1913

#### Over 1,000,000 Sold

Rich Tungsten Valves have been thoroughly tested in cars for all purposes and have been adopted as standard valve equipment by many of the leading motor car builders of America. Truck builders are also fast adopting Rich Tungsten Valves, owing to their ability to successfully withstand the excessive heat generated in motors pulling heavy loads.

#### Send for Interesting Book

Tells valve facts of vast importance to users and car builders. Prices on Rich Tungsten Valves of any size and in any quantity gladly furnished on request.



Condition of Rich Tungsten Valve After 3411 Miles. Note Glass-Like Surface of Seat.

# Rich Tool Co., 414 Railway Exchange Bldg Chicago, Ill., U.S.A.

*When Writing to Advertisers, Please Mention Motor Age.*

# The Atwater Kent Ignition System



## You used to drive your car as a "stunt"

Today you drive it for pleasure or business and the less you have to think about "stunts" the better you like the car.

There was a time when changing gears was a stunt. Keeping the sight feed oiler at its work, and the coil tremblers tuned up, and the gas generator in condition to generate were other feats of that Stone Age of motoring.

But if you had to go through all those *coups de legerdemain* today you would sell your car and use the trolley.

But there's one bit of juggling that you still practice—and it takes some skill, too! That is the manipulation of the spark lever.

There's a difference between managing the spark and managing the throttle. The latter is voluntary; you open the throttle to go faster and close it to go slower. But the former is forced upon you by the peculiarities of the engine. You advance or retard the spark because you must, not because you like to. And many drivers never really get the knack—they advance or retard at the wrong time, and fuel is wasted and bearings strained in consequence.

Hand control of the spark, for ordinary ranges of speed, is really as much a relic of the past as constant regulation of the mixture would be. Just imagine yourself juggling with the carburetor in the way you do with the spark advance! Automatic control is as sure to come in the one case as in the other, and it is already here, for some thousands of motorists who have read the signs of the times and provided themselves with the truly modern kind of ignition service.

We should like to tell you all about the new Atwater Kent System—Type K—not merely because we want to sell it, though naturally that is a factor, but because we know that automatic spark control is the coming thing, and that the Atwater Kent embodiment of that principle gives the ultimate in reliability, efficiency, and convenience. There's not a motorist who installs it but wonders how he ever endured the annoyance so long. And the marvel of it all is the simplicity and low cost of the device!

In another year or two, automatic control will be universally demanded. You will want to be in the forefront. Write your name and address on the margin of this page and we will send you our Booklet "A" and full particulars of the Atwater Kent System without obligation on your part.

## ATWATER KENT MFG. WORKS

4934 Stenton Ave., Philadelphia, Pa.

### DISTRIBUTORS

New York, E. J. Edmond Co.; Chicago, Motor Car Supply Co., Pellets Magneto Exchange; San Francisco, Chanslor & Lyon Co., Weinstock-Nichols Co.; Los Angeles, E. A. Featherstone; Seattle, Chanslor & Lyon Co.; Portland, Ballou & Wright; Omaha, Omaha Rubber Co., Powell Auto Supply Co.; Dallas and Houston, Fisk Co. of Texas; Wichita, Hockaday Auto Supply Co.; St. Louis, Missouri Auto Specialty Co.; Salina, Lee Hardware Co.; Kansas City, Kansas City Auto Supply Co.; Milwaukee, Julius Andrae & Sons Co.; Detroit, Automobile Equipment Co.; Boston, Motor Supply Shop; Denver, Auto Equipment Co.; Hartford, Post & Lester Co.; Atlanta, Elyea-Austell Co., Chattanooga, Southern Auto & Supply Co.

When Writing to Advertisers, Please Mention Motor Age.



# PLEASURE CAR DEALERS!

## Increase your income during the dull summer months selling

# MOON TRUCKS

### Read This!

**PLATT & THORNBURGH  
PAINT CO.**

Paint and Color Makers

St. Louis, Feb. 4, 1918.

Jos. W. Moon Buggy Co.,

Main and Douglass Sts.,

St. Louis, Mo.

Gentlemen: We have your favor February 3rd making inquiry concerning the service given us by the ton and a half truck which you sold us about six months ago, and we take pleasure in stating that we are getting excellent service, not alone in the way of the truck and tires, but in the amount of work we can do with this machine, which really exceeds what we expected of it. The amount of our deliveries required one two-horse light wagon all of the time, and a one-horse delivery wagon about two-thirds to three-quarters of the whole year, all of which we are now doing with this truck, and could still do more. From what we have been able to judge the engine and other mechanical parts of the machine are wearing excellently and have given us no cause for complaint.

Yours very truly,

**PLATT & THORNBURGH  
PAINT CO.,**

Lew Broustir, Secretary.

FROM June to September—3 whole months—there is a decided let-down in pleasure car sales. These three months should not be let go to waste.

It takes time to sell trucks, but these dull summer months afford pleasure car dealers ample time to ferret out truck prospects and clinch sales with them.

The prospects are there. Go out and get them. Demonstrate to them the business expanding features of MOON TRUCKS. Make your income "all year round." Let profit come to you in a steady stream, not in spurts.

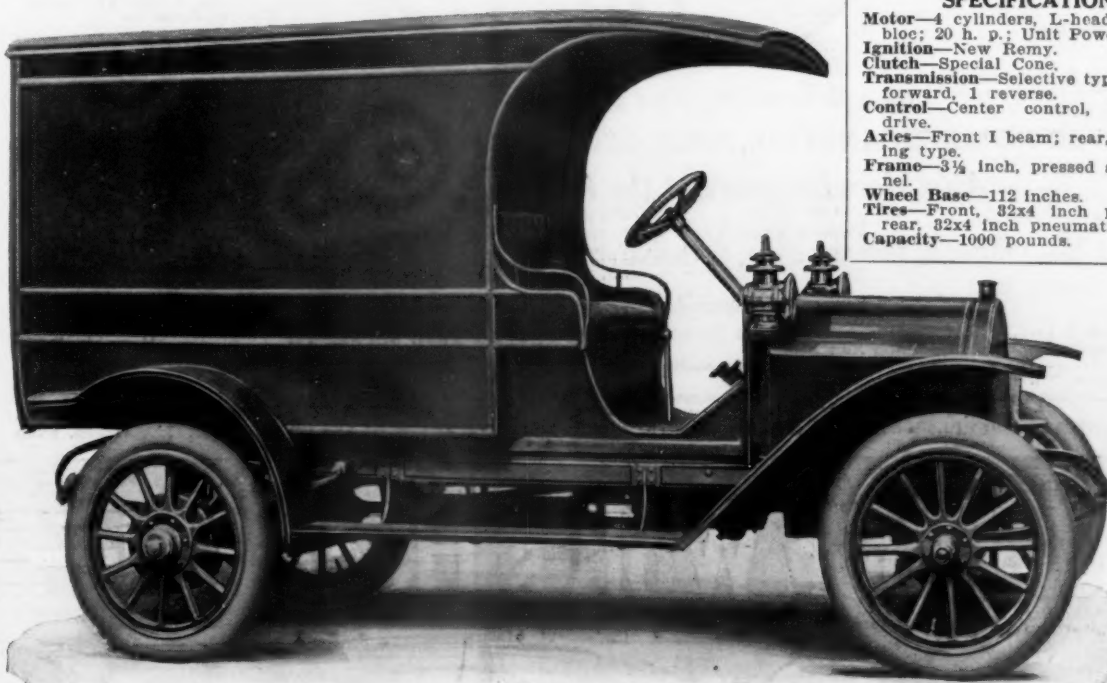
*Write for Generous Agency Proposition*

2 Chassis "A Moon for Every Prospect  
A Prospect for Every Moon" Any Style Body

The MOON line comprises 2 chassis models—Model A, one-half ton truck, and Model B, 1½ ton truck. Almost any style body to accommodate the needs of any business can be supplied. MOON TRUCKS range in price from \$1350 to \$2150. THE MOON MODEL B bus is priced at \$3200.

*Write for Complete Information*

**JOS. W. MOON BUGGY CO., St. Louis, Mo.**



### SPECIFICATIONS

**Motor**—4 cylinders, L-head type; En bloc; 20 h. p.; Unit Power Plant.  
**Ignition**—New Remy.  
**Clutch**—Special Cone.  
**Transmission**—Selective type, 3 speeds forward, 1 reverse.  
**Control**—Center control, left hand drive.  
**Axles**—Front I beam; rear, full floating type.  
**Frame**—3½ inch, pressed steel channel.  
**Wheel Base**—112 inches.  
**Tires**—Front, 32x4 inch pneumatic; rear, 32x4 inch pneumatic.  
**Capacity**—1000 pounds.

**MODEL A—No. 21 PANEL BODY, CAPACITY 1000 LBS. PRICE \$1,600**

# Why risk going against the motor manufacturers' knowledge of oil?

It costs only \$3 to \$4 a year more to stop abusing your motor and use the proper oil.

That's why the leading manufacturers are investigating oils and vigorously advising the use of Wolf's Head Oil.

Here are some of the famous manufacturers who already use or advise the use of Wolf's Head Oil:

Overland  
Lozier  
Oldsmobile  
Hupmobile  
Mitchell  
Columbia  
Stoddard-Dayton  
Maxwell  
Paige-Detroit  
Isotta  
Silent Knight Daimler  
Mercedes  
Clement-Bayard  
Itala  
Warren  
Federal Motor Truck Co.  
Marion



Sampson Truck  
Brush  
Gas Engine & Power Co. and  
Chas. L. Seabury & Co., Cons.  
Van Blerck Motor Co.  
Electric Launch Co. (Elee)  
Reliance Motor Boat Co.  
Scripps Motor Co.  
Builders of Motor in the  
celebrated "Detroit."  
Blount & Lovell  
Crane Brothers  
Makers of Dixie IV Engine  
Midland Motor Co.  
Loew Victor  
Weckler-Fauber  
Fifield Bros.

*Insist on Wolf's Head Oil In the Original Sealed Cans*

**WOLVERINE LUBRICANTS CO., MAIN OFFICE, 78 BROAD STREET, NEW YORK**

**Also Manufacturers of the famous PACKARD Oils**

Plants: New York City and Franklin, Penna.

Branches: CHICAGO, PHILADELPHIA, WASHINGTON, BOSTON, UTICA, BUFFALO, PITTSBURGH

## **Territorial Agents:**

W. P. FULLER & CO. .... San Francisco  
Pacific Coast, Australia and New Zealand  
BUHL SONS CO. .... Detroit, Mich.  
Michigan, Northern Ohio and Northern Indiana  
CANADIAN FAIRBANKS-MORSE CO., Limited. .... Montreal  
All Canada  
ARTHUR STORZ AUTO SUPPLY CO. .... Omaha, Neb.

THE OZBURN AUTO SUPPLY CO. .... Memphis, Tenn.  
EVANS OIL WORKS. .... Cincinnati, O.  
BARTLES-MAGUIRE OIL CO. .... Milwaukee, Wis.  
THE EQUIPMENT CO. .... Kansas City, Mo.  
SOUTHERN HARDWARE & WOODSTOCK CO., New Orleans, La.  
OGDEN PAINT, OIL & GLASS CO. .... Ogden, Utah

# Insist Upon Wolf's Head Oil—

## Just As the Motor Manufacturers Do

*When Writing to Advertisers, Please Mention Motor Age.*





SIX YEARS AHEAD

**Electric automobile lighting in 1907!**

# The Aplco System

**was the first to be installed; always the best**

In 1907 Mr. Vincent G. Apple installed an electric lighting system on the Franklin car shown above. It was the first electric-lighted automobile; it is still doing service on the streets of Dayton. Apple equipped cars were exhibited at shows years ago.

**W**HEN you start out to equip your car with a lighting outfit you'll find that with most of the systems offered you must adapt your requirements, your convenience and the appearance of your car to the necessities of the system—or do without it.

The Aplco system is the other way; made to conform to *your* requirements. One of our dynamos will adapt itself as perfectly to the construction of your car as if built especially for it.

**Within everyone's price**

The Aplco System is the best for your car; its quality is of the highest required for high-priced cars; its price is in proportion to the cost of any low-priced car.

Please send to us for detailed information of how your car can be put a year ahead with the Aplco System, and learn the name of our nearest service station.

**The Apple Electric Company, 67 Canal Street  
Dayton, Ohio**

# AUTO-LITE ELECTRIC STARTING and LIGHTING SYSTEM

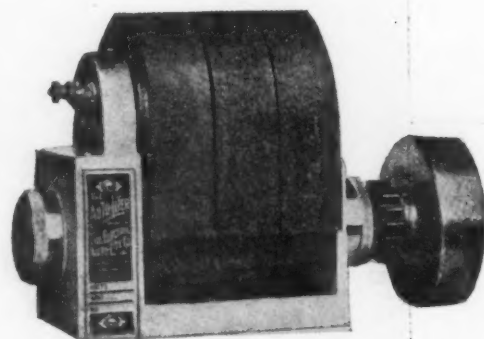
## The Simplest System Made

**S**IMPLICITY is the fundamental principle of "Auto-Lite" construction. It is the foundation on which the success of the "Auto-Lite Electric Starting and Lighting System" for motor vehicles, is built.

In the seven years spent in experimentation and research before this perfected system was placed on the market, our effort was to eliminate everything that was made for complication. The standing order to our engineers was to provide simplicity and quality only.

### INDEPENDENT UNITS

The "Auto-Lite Electric Starting and Lighting System"—consisting of two mechanically independent units, operating on a 6-volt current, is the most simple, rugged and dependable of any system. The intricate construction, the numerous delicate parts, and the excessive weight required for devices operating on high voltage, are entirely done away with in this System.



### ONLY TWO MOVING PARTS

There are but two moving parts in this system—the armatures in the starting motor and the lighting generator. These operate on the finest imported ball-bearings obtainable, and wear, due to friction, is reduced to a minimum. The commutators, switches, and other parts are within easy reach and instantly accessible.

### SMALL, LIGHT AND COMPACT

The generator and motor are small, light and compact, though as strongly and ruggedly built as any other part of a motor car. The system is designed to be built into the new automobile as an integral part of the power plant.

### QUICK DELIVERIES

Our production facilities are unsurpassed in the accessory industry. We are the largest, exclusive manufacturers of Electric Starting and Lighting Systems in the country. We have nearly 100,000 square feet of space and thousands of dollars worth of the most modern, automatic machinery devoted to the manufacture of the "Auto-Lite Electric Starting and Lighting System."

### CATALOGUE FREE

Manufacturers, dealers, owners and prospective purchasers will find our catalogues and literature, both technical and non-technical, describing the System in detail. They are very interesting and important in the explanation of a perfect Electric Starting and Lighting System.

We have an especially attractive proposition for dealers who desire to install the Lighting System, only upon cars now in use. Write today



## THE ELECTRIC AUTO-LITE COMPANY

Main Office and Factory  
TOLEDO, OHIO

BRANCHES—New York, Kansas City, San Francisco





*Makes Every Gasoline  
Motor Worth More*

**Polarine**  
FRICTION REDUCING MOTOR OIL

Polarine starts to lubricate at the **first turn** of the motor—even in winter, after standing for hours at a temperature of zero. **It maintains the correct lubricating body at any motor speed or heat, on the hottest summer day.**

It penetrates to every part and gives it full protection. It keeps friction at the no-wear point and thus obviates many costly repairs.

And it serves in any type of motor—motor cars, motor boats, motor trucks.

Don't spoil a good motor with poor oil. And don't judge motor oil by appearance. The **poorest** oils may **look** as good as the best.

Polarine is made by the **World's Oil Specialists** after fifty years' experience with every kind of friction problem. Present day possibilities do not permit of the making of any better oil. All our vast facilities and resources are concentrated on Polarine.

**Standard Oil Company**

(AN INDIANA CORPORATION)

Makers of Special Lubricating Oils for Leading  
Engineering and Industrial Works of the World

(110)



## 20,000 Miles in 29 Weeks

**H**ERE is a letter which will interest every motor car owner. It was written by a young merchant of Columbus, Neb., and shows just the kind of service and satisfaction which Marion owners get from their cars.

"On June 1, 1912, I put your Marion roadster in service, calling on our wholesale grocery trade out of this city.

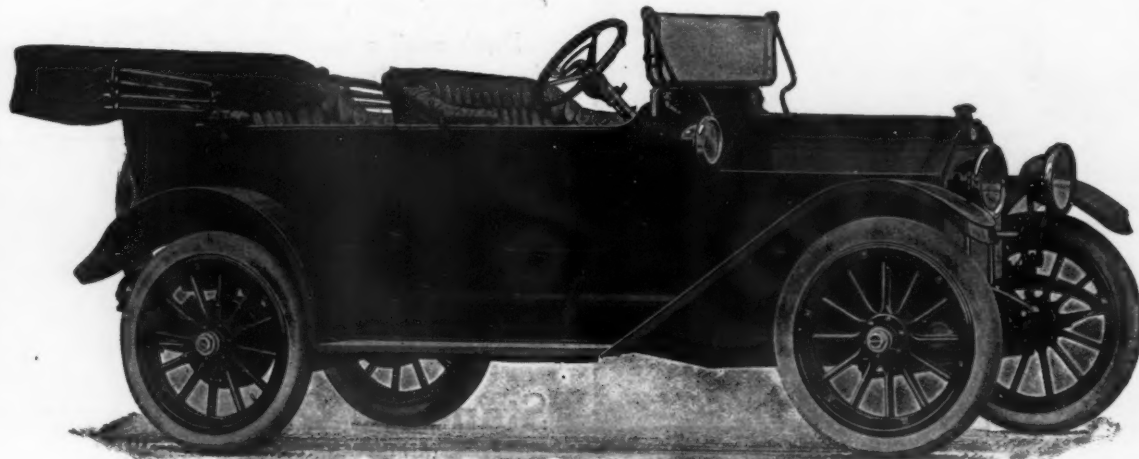
"I cover 62 towns, making 31 per week, an average of 5 towns a day and 600 miles per week, regardless of weather and road conditions.

"Including pleasure driving to

this date (January 11) I have driven my car 20,000 miles; am using 3 of the original tires, and have averaged 13 miles to the gallon of gasoline over this entire distance.

"My upkeep has been of little moment, and the car is in first-class condition. It is an economy in both time and money saved in calling upon my trade."

Let us show you how well the Marion will meet your motoring needs. Drop in and see the cars—they are displayed by Marion dealers everywhere. Note the completeness of equipment, gas and electric self-starters, etc. There are two touring and two roadster models. Send to us for illustrated Marion books, last edition.



Marion 37-A five-passenger touring car, tully equipped, \$1475

*Made in Indianapolis by*

**The Marion Motor Car Co.**

902 Oliver Avenue



**Starts — Lights — Ignites**

**REMY**

**Six Volt System—Does-It-All**

**W**HEN you specify "Remy" as the electrical equipment of your product you eliminate all risk of car depreciation next season.

The Remy is a permanent, established company of 14 years, success. Remy apparatus is standard; it is dependable and up-to-date season after season.

And the Remy is the only factory in America furnishing the entire electrical equipment for your product—Starting, Lighting and Ignition apparatus in whole or in any combination. Responsibility for the efficient electrical operation of your product is borne by one factory.

Remy Starting and Lighting Equipment is adapted to individual car needs and is sold only to manufacturers. Individual owners of Remy apparatus have the benefit of a National system of service stations.

*Write us about our liberal magneto (any make) exchange offer*

**Remy Electric Company, Anderson, Indiana**

**BRANCHES:**

New York

Detroit  
Chicago

Kansas City

Minneapolis  
San Francisco

Boston

Service stations throughout the country

# Overland

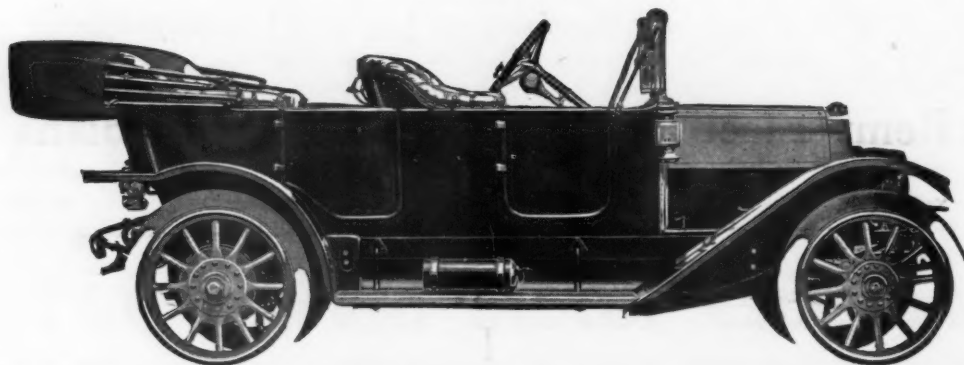
**I**T pays to buy the reputable, the standard. The Overland five passenger touring car at \$985 is a better, safer and more satisfactory buy than a car of unknown name and quality at \$5000.

*Catalogue on request. Please address Dept. 46*

The Willys-Overland Company  
Toledo, Ohio

**\$985 Completely Equipped**

F. O. B. Toledo







**One copy  
of this  
TIRE  
HAND  
BOOK  
FREE.**

"The best book on tires ever published." Quoted as authority by foreign and American Auto Journals.

**All about your tires.**

Correct Pressure	Correct Size
Care of Rims	How to Cut Down Repair Bills
Care in Winter	How to Get 10,000 Miles Service
Emergency Repairs	Effects of Careless Driving
Care of Spare Tires	Prevention of Overheating

**All about**

**SHALER Vulcanizers**

How they make one tire outwear three, by enabling you to seal cuts, punctures, sand-pockets, etc., before dirt and water get inside to rot the fabric. The truth about vulcanizing and how anyone can do his own tire repairing at almost no expense, trebling the life of casings and eliminating tube repair bills. No experience necessary to use a Shaler because its temperature is controlled automatically. Heat is obtained from your city lighting circuit, or steam vulcanizers are furnished for use where electricity is inaccessible.

Prices \$2 and up.

**C. A. SHALER CO.,**  
222 Fourth St.      Waupun, Wis.

Send the coupon today  
and learn how you can  
treble your tire mileage.

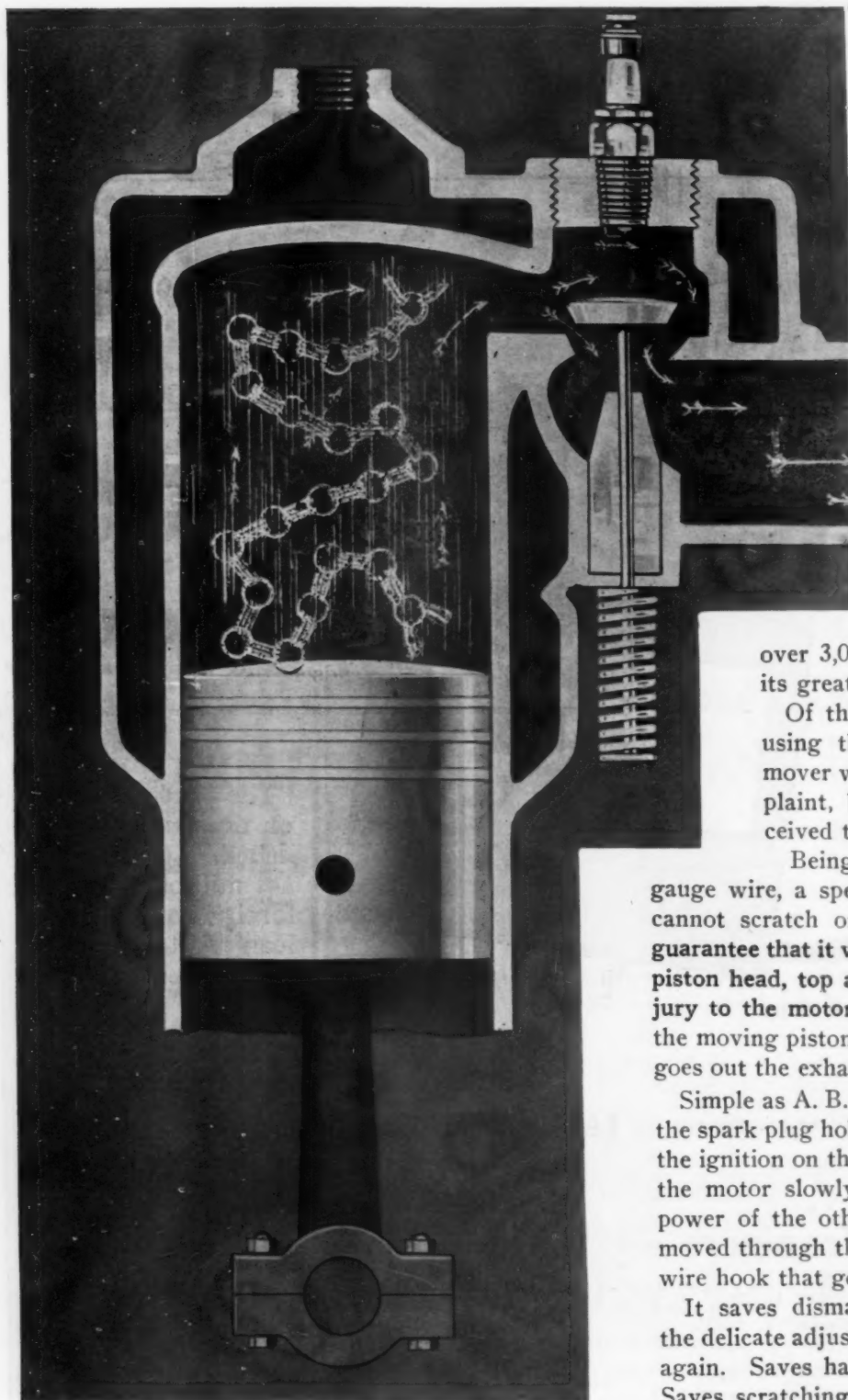
**C. A. Shaler Co., 222 Fourth St., Waupun, Wis.**

Please send me, without cost or obligation, a copy  
of "Care and Repair of Tires."

Name .....

Address .....

Size of Tires .....



**SHOWS MICHENER CHAIN CARBON REMOVER IN OPERATION**

hard scales of carbon. Furthermore, it only takes a few minutes at home or on the road to use it. Get two chains and you can clean two cylinders at same time. State kind of motor when ordering.

**Price 75c or 3 for \$2.00**

Get them from your dealer, or if he cannot supply you, I will send direct postpaid.

**E. S. Michener, Washington Street, New Castle, Pa.**

## Over 3000 Jobbers and Deal- ers in the United States Now Recom- mend and sell the Michener Chain Carbon Remover

In 1910 we advertised in Motor Age the names of but 15; in 1911, 45; in January, 1912, 245. The list of jobbers and dealers now selling this device has grown to over 3,000. Isn't this ample evidence of its great efficiency and popularity?

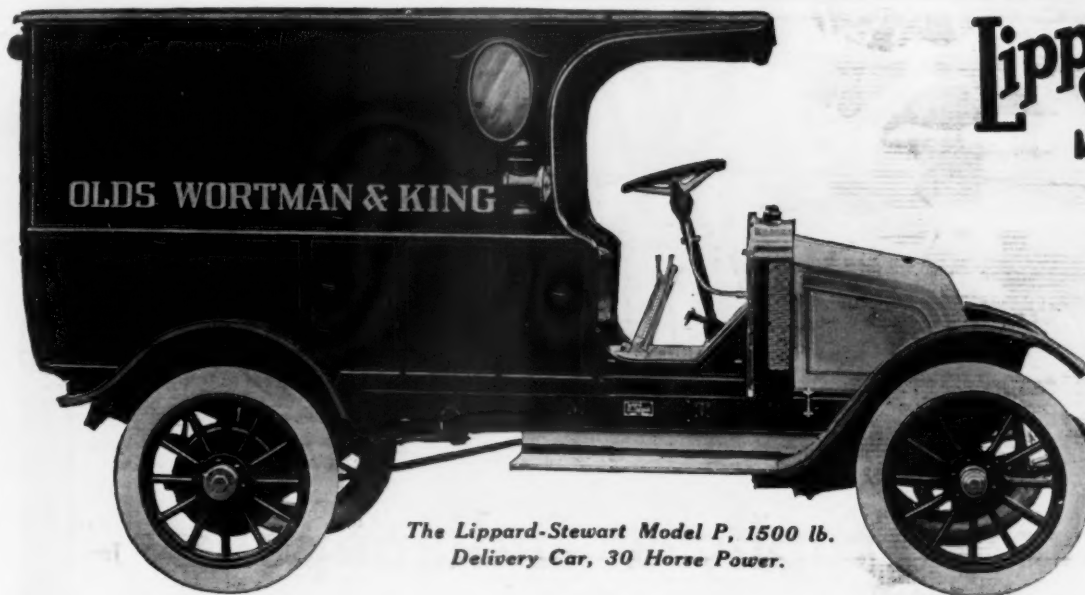
Of the thousands of autoists who are using the Michener Chain Carbon Remover we have not received a single complaint, but on the other hand have received thousands of commendations of it.

Being a flexible chain, made of a light gauge wire, a special composition, 90% copper, it cannot scratch or score a cylinder. I positively guarantee that it will remove all the carbon from the piston head, top and sides of cylinders without injury to the motor. The scouring effect caused by the moving piston takes all the hard scale off which goes out the exhaust.

Simple as A. B. C. to use. Poke the chain through the spark plug hole, pour in a little kerosene; cut off the ignition on the cylinders being treated, then run the motor slowly two or three minutes with the power of the other cylinders; chain is readily removed through the spark plug hole with the special wire hook that goes with each outfit.

It saves dismantling the motor and disturbing the delicate adjustments which are difficult to secure again. Saves having your car out of commission. Saves scratching or nicking the cylinder walls, as is liable to occur using sharp edged tools, the old hand scraping way. It is the only carbon remover on the market today that will absolutely remove the





*The Lippard-Stewart Model P, 1500 lb.  
Delivery Car, 30 Horse Power.*

# Lippard-Stewart

## The Delivery Car

Chassis, \$1650  
Standard  
Panel Body  
\$150

Standard  
Express Body  
\$125

### The Measure of a Delivery Car's Worth Can Best Be Judged by the Friends It Has Made.

As a business man you know that the reputation of any delivery car depends entirely upon that car's ability to give the maximum of efficient and economical service under most adverse conditions over a long period of time.

What the Lippard-Stewart Delivery Car has done and how well it has done it—and is doing it now—is best evidenced by the complete satisfaction this car is giving its users—a partial list of which we append herewith:

#### Some Prominent Users of Lippard-Stewart 1500 Lb. Delivery Cars

**New York City**  
Forsyth's Department Store.  
Rogers-Peet Co., Clothiers.  
Parcels Post Service.  
Dow Lunch Co., Quick Lunch.  
Stern Bros. Department Store.  
Browning, King & Co., Clothiers.  
McPartland & O'Flaherty, Dry Goods.

**Pittsburg, Pa.**  
James Lowrie & Sons, Undertakers.  
Kuhn & Bro., Grocers.  
W. R. Kuhn & Co., Grocers.  
Boggs & Buhl, Department Store.  
Meyer & Jonasson Co., Dry Goods.

**Portland, Ore.**  
Chancellor & Lyon, Motor Supplies.  
Olds, Wortman & King, Department Store.

Graves Music Store.  
Ballou & Wright, Motor Supplies.  
Meier & Frank, Department Store.  
**Buffalo, N. Y.**  
Hoefler Ice Cream Co.  
Buffalo Courier.  
Larkin Co., Soaps.

**San Francisco, Cal.**  
Hale Bros. Department Store.  
Arnstein & Simon, Woolens.  
White House, Dry Goods.

**Washington, D. C.**  
Barber & Ross, Hardware.  
Holmes Pie Bakery.

**Boston, Mass.**  
F. H. Johnson, Commission Merchant.  
Welch Bros., Florists.

**Schenectady, N. Y.**  
H. S. Barney Co., Department Store.

**Savannah, Ga.**  
Savannah Brewing Co.

**Chicago, Ill.**  
Wells Bros., Contractors.

**Brooklyn, N. Y.**  
H. W. Rohlf & Son, Hardware.

**Troy, N. Y.**  
Carle & Co., Department Store.

**Baltimore, Md.**  
M. Albert & Sons, Commission Merchants.

**Knoxville, Tenn.**  
M. M. Newcomer, Dry Goods.

### These Business Men Know the Worth of Lippard-Stewart Light Delivery Cars

They know it for a real delivery car—designed and built for delivery purposes only. They know it is not a compromise—not a commercial body on a pleasure car chassis, but a practical commercial vehicle that has done for them more than we claimed for it. They have found it strong, dependable and serviceable—low in first cost, economical in up-keep—a car that will deliver more goods over a wider area at less cost per package than was ever thought possible.

These statements are most emphatically not the claims of an overly-enthusiastic manufacturer. The business men named above can tell you that they are facts.

Read the specifications of this car closely. Examine its perfect chassis and its frame built heavier and wider at the point of greatest stress. Note the 30 H. P. Continental Motor. As a dealer—a man who knows cars—your knowledge of this motor will evidence its efficiency. Consider the sturdy cone clutch and the transmission strong enough for a 50 H. P. car. Observe the shaft drive, the differential, the simplicity of construction, generally, and, above all, the actual accessibility of the car. Look at center control, the left hand drive and the special spring suspension that assures easy riding and minimizes wear and tear.

The Lippard-Stewart line is most comprehensive. The large production and volume of sales make this possible. It offers you a car for practically every firm and individual who need a delivery car. It is a line that will build for you a profitable and increasing business upon the firm basis of satisfied customers. Compare this car with any delivery car apparently competing with it and its superiority is at once established. As a dealer, form your own conclusions as to the car's value as a business investment for you—its ready saleability and the quick turnover of capital it assures. Then write or wire us for dealer's proposition.

### Lippard-Stewart Motor Car Co.

Buffalo, New York

Manufacturers of 1500 lb. Delivery Cars of Every Description

AUGUST BECKER, President and Treasurer

E. J. BARCALO, Vice-President

J. C. MILLAR, Secretary

C. S. DAHLQUIST, Chief Engr.

W. F. REYNOLDS, Sales Manager

#### LIPPARD-STEWART MOTOR CAR CO.

(M.A.)

Buffalo, N. Y.

Please send catalogue and dealer's proposition immediately.

Name .....

Street .....

City ..... State .....

# WIRE WHEELS WIN!

## Every Trophy at Indianapolis

Jules Goux driving his wire wheel equipped Peugeot first in 500-mile race, winning \$20,000.

Spencer Wishart in his wire wheel equipped Mercer second in 500-mile race, winning \$10,000.

Jules Goux in his wire wheel equipped Peugeot first at 400 miles, winning \$10,000 Wheeler and Schebler Trophy.

Jules Goux in his wire wheel equipped Peugeot first at 300 miles, winning \$2,500 Prest-O-Lite Trophy.

Jules Goux in his wire wheel equipped Peugeot first at 200 miles, winning \$2,500 Remy Grand Trophy.

In addition to winning all these prizes, wire wheels were on six of the ten cars to finish in the money in the 500-mile race.

Of the twenty-seven cars that faced the starter, fourteen were equipped with wire wheels, or over 50 per cent, which is more than double the wire wheel equipped cars that started in the same contest a year ago. It is interesting to note that of the three Mercers which participated in the race the one carrying wire wheels was the only one to finish in the money. This is simply a straw which indicates one way to refine your car as well as to reduce the cost of up-keep both of tires and engine. The same keen judgment which dictated the selection of wire wheels in this fight for speed supremacy should influence you to insist upon wire wheels on your cars. You can get them if you will but insist. Every American manufacturer knows that he must furnish wire-wheel equipped cars, for he knows that not only are wire wheels faster and more resilient than all others, but that wire wheels will increase the life of your tire wear from 25 to 50 per cent.

**The McCue Co., Buffalo, N. Y.**



Jules Goux on Peugeot Racer for Indianapolis Event

When Writing to Advertisers, Please Mention Motor Age.



# The BOSTON STARTER

## You Pull once-You Start Always

### Specially Designed for Ford Cars

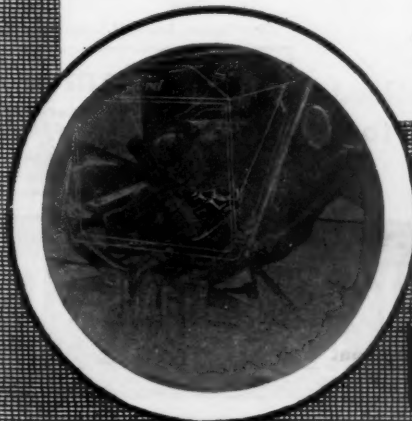
**Y**OU can add 25% to the utility and convenience of your Ford Car by equipping it with the BOSTON STARTER.

You can make thousands of instantaneous and unfailing starts without ever remembering that your Ford has a crank.

The BOSTON STARTER is the simplest, most easily applied and the least expensive starting device ever offered to motorists. It does not depend on any gas tanks, storage batteries or other uncontrollable freaks. A simple pull on the handle on the dash transmits its motion to your motor. The result is easy and immediate starting—no trouble, no annoyance.

Your Ford car is not complete without the BOSTON STARTER.

Western Office—No. 803 Citizens' Bldg., Cleveland, Ohio



**AUTOMATIC APPLIANCE CO.**  
172 Columbus Ave. Boston, Mass.

Western office—803 Citizens Bldg., Cleveland, Ohio.

# No more fear of rim troubles when you ride on Diamond Tires

When you ride on Diamond Tires you need have no fear of rim troubles.

Diamond (No-Clinch) tires are built with Perfect 3-Point Rim Contact that fit and hold the rim with a vise-like grip. This perfect rim fit means perfect balance—means that the tire is fighting the *road*, not the *rim*—insuring immunity from all forms of rim troubles, including cutting and breaking above the bead.

The annealed steel cabled wires imbedded in the bead form a rigid ring of support that holds in every emergency, permits proper inflation and positively prevents tire from creeping or slipping off rim.

## Vitalized Rubber Diamond {No Clinch} Tires built with more air-room

It's the extra air-room that does the work. The more air-room the more resiliency, with less racking and jolting of your engine and car—which, in turn, means more comfort for you and your guests—*more comfort for your tires.*

All Diamond Tires are now made of Vitalized "More Mileage" Rubber, with Perfect 3-Point Rim Contact, No-Pinch Safety Flap and, if you wish, the now famous Safety (Squeegee) Tread.

So this time buy Diamond Vitalized Rubber Tires—you can get them to fit your rims at any of the



*Cross Section, Diamond Safety Tread Tire*

**Be a Diamond Dealer** If you are not a Diamond Dealer now is the time to get in line. There is a Diamond Branch near you—get in touch today.

# 25,000 Diamond Dealers always at your Service

*When Writing to Advertisers, Please Mention Motor Age.*



# Letters From Stearns-Knight Owners

(No. 37)

**"Under no circumstances would I  
go back to the poppet-valve type"**

" \* \* To me, the greatest pleasure in motoring is in driving my car, and under no circumstances would I go back to the poppet valve style of motor. I was never thoroughly satisfied with the cars I previously owned and was always looking forward to buying a new one. I am, however, so well pleased with the Stearns-Knight motor and the delightful riding qualities of the car, that if the time should ever come when I want to buy a new car, I would not consider any other make."

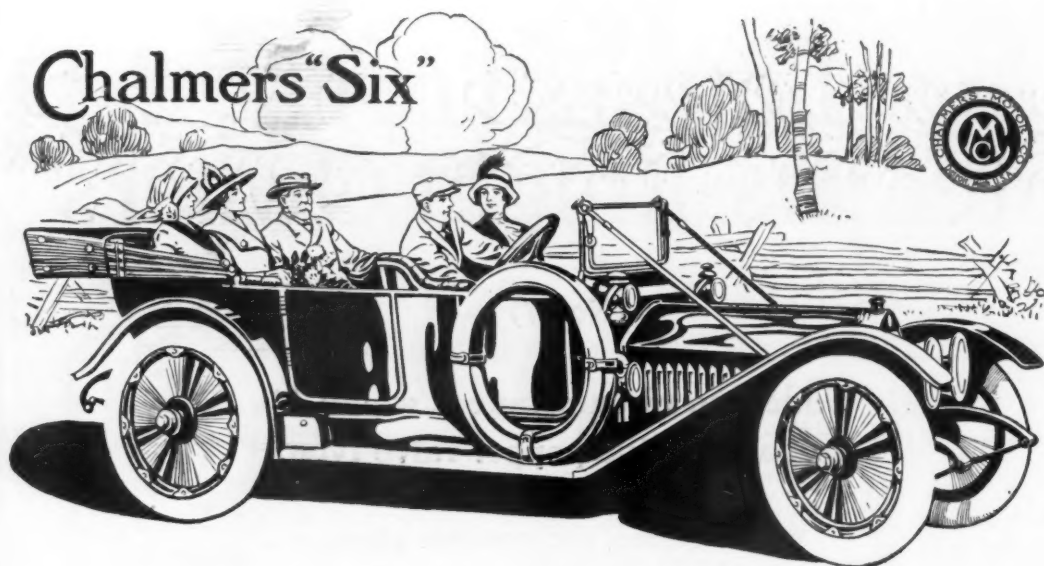
(Name Furnished Upon Request)

**Stearns**  
THE ULTIMATE CAR  
(KNIGHT TYPE MOTOR)

## The F. B. Stearns Company

Cleveland, Ohio

Branches and Dealers in 125 Cities



## Of Thoroughbred Stock

You know what that expression means when applied to a horse—especially if used by one who knows horses.

What a thoroughbred is among horseflesh, the Chalmers "Six" is among motor cars. And we use the term exactly—as the old horseman would use it—and not in the careless speech of the grandstand.

For the Chalmers "Six" rings true to the thoroughbred definition—"pure bred and of running stock."

Staunch of frame and sinew, powerful, full of life, alert and eager, yet easily controlled—this great car has all the thoroughbred qualities.

Clean-cut in appearance, trim, graceful, well-groomed, the "Six" gives the same eye-delight as a handsome, proud, blooded race-horse.

And the "Six" is a pedigreed car, too. Its predecessors—Chalmers "30" and

Chalmers "Thirty-six"—were winners before it—victors on track and road; record breakers in sales, too.

The "Six" is built in Chalmers shops under the direction of men who take as much pride in a fine motor car as horsemen ever took in fine racing stock.

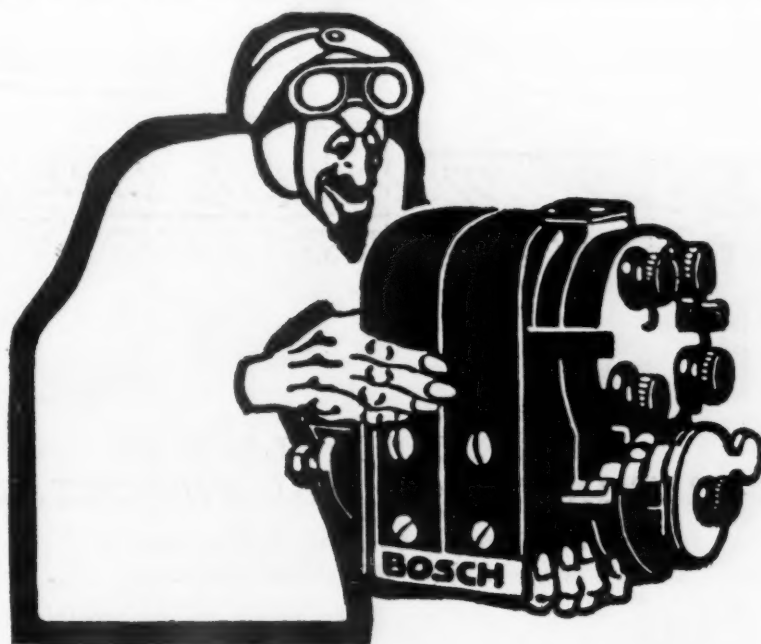
And this great car, with such "stuff" in it (as the horsemen say), with such lineage behind it, such quality and breeding in every line of it, we sell you at a medium price—\$2600 for the 7-passenger Touring Car.

More satisfaction, service, pride of possession, you cannot buy. Better performance you cannot find in any car men have yet built. Everything in the way of convenience and luxury this "Six" supplies you.

May we offer you proof in the car itself? Please phone or call at our dealer's salesroom.

**Chalmers Motor Company, Detroit**





# B O S C H

## Makes a Clean Sweep, of Course, of the 500-Mile Sweepstakes

Car.	Driver.	
1. Peugeot	Goux	Bosch Magneto
2. Mercer	Wishart	Bosch Magneto and Plugs
3. Stutz	Merz	Bosch Magneto and Plugs
4. Sunbeam	Guyot	Bosch Magneto and Plugs
5. Mercedes	Pillette	Bosch Magneto and Plugs
6. Grayfox	Wilcox	Bosch Magneto and Plugs
7. Mercedes	Mulford	Bosch Magneto and Plugs

The supremacy of Bosch products evidences itself not only during such severe tests as this, but particularly in the case of private owners, who can join the ranks of the victors by merely specifying

**Bosch Magneto and Bosch Plugs.**

# BOSCH MAGNETO CO.,

223 West 46th St., New York City

# MERCER

## WINS SECOND PLACE IN 500-MILE INTERNATIONAL SWEEPSTAKES

**Time—6 hours, 45 minutes, 6 seconds**

**Average Speed—75 miles per hour**

A 300 cubic inch Mercer cemented its right to recognition as America's premier medium-weight automobile, when it finished second in the world-famous 500-mile race at Indianapolis, May 30.

The only car to make a better showing was the French Peugeot, half again as large as the Mercer, and considered as the world's most wonderful speed creation.

Mercer design, Mercer construction and Mercer quality are always ready to be pitted against the best that other manufacturers can offer. And in the hardest and longest contests, where durability and consistency count, the Mercer shows up best. This should have much significance to the prospective motor car buyer.

**Mercer, with its pronounced superiorities  
is sold in four different models**

**Prices—\$2600 to \$2900**

*Descriptive literature sent on request*

### MERCER AUTOMOBILE COMPANY

800 Whitehead Road, Trenton, N. J.



*When Writing to Advertisers, Please Mention Motor Age.*



# Greases—Useful facts for Motorists

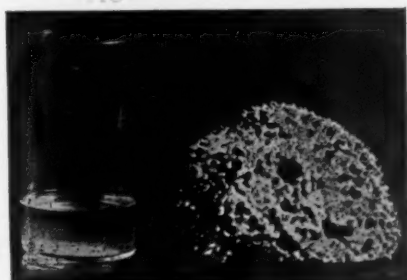
We have given you the facts about Gargoyle Mobiloils. We will now turn to our greases.

Grease is nothing more nor less than a fatty sponge saturated with oil. The sponge is merely the carrier of the oil. The oil does the lubricating.

The better the grease sponge the more oil it will absorb.

This fact may be demonstrated by means of two bath sponges and water, as shown by the illustrations.

One sponge should be of a high grade, with fine pores. The other, an inferior quality, with coarse pores.



The water in this glass was squeezed out of the low-grade sponge beside it.



The water in this glass was squeezed out of the high-grade sponge beside it. This shows that the high-grade sponge will absorb nearly twice as much as the low-grade sponge in the first illustration.

Saturate both with water, then squeeze into two glasses.

You will find that the high-grade sponge has absorbed nearly twice as much water as the inferior sponge.

So it is with grease sponges.

A grease sponge properly made of high grade material will absorb a high percentage of oil.

A low-grade grease sponge will absorb a much lower percentage of oil.

The percentage of oil absorbed by our grease sponges is unusually high.

The body of grease sponges is animal fat, derived from many sources.

Inferior sponges are made of fats from the offal of slaughter houses, from the scrapings of the floors of slaughter houses, or from the by-products of garbage reduction plants.

The greases having such sponges are dark in color. They are foul smelling. They contain animal tissues which promote decomposition. They will not stand air nor heat. When they are used, acids are liberated which have a bad effect on metallic surfaces.

To overcome the dark color some manufacturers add chalk, gypsum, asbestos, etc. These whiteners are heat-producing and are apt to cause friction rather than prevent it.

In making our greases, only expensive prime white fats are used.

These fats are obtained from large high-grade packing houses. They are selected and refined. They go through several processes.

The Vacuum Oil Company's Transmission Greases are made from a high-grade tallow fat. This fact is important, because tallow is itself a very good lubricant.

Our Mobilubricant is the very best grease in the world for use in cups, especially the automatic kind which is now used very extensively.

Inferior greases should never be used in automatic cups if the automobilist wants to be sure that he will not injure his machine. These cups are operated by a spring which presses down on the grease. When the cup is full, naturally, the spring is at its strongest. With inferior greases it presses out the oil faster than the body of the grease. The result is that when the cup is only about one-third full, there is no oil left, but only a waxy substance. The motorist has no way of knowing that the oil is all out of this substance, and that there is no more oil going into the bearings. He is, therefore, very apt to have trouble.

The use of inferior greases in cups is extravagant. So much is thrown away as waxy substance.

Mobilubricant will hold its body to the end. The body will be fed

along with the oil, and every bit of the contents of the cup will be fed and utilized as a lubricant.

An important factor in the manufacture of high-grade greases is the elimination of moisture.

The less moisture the better the grease.

Inferior greases are cut at every point in order to meet price competition, and, therefore, sufficient time cannot be taken in the processes. If they are only ten hours in the process which causes evaporation, there cannot be as much moisture eliminated as if they are in that process fifteen hours. Our greases remain in this process up to twenty-six hours.

The Vacuum Oil Company's line of greases is the most complete on the market. It includes greases of different consistencies for all conditions. They are:

**VACUUM OIL CO.'S TRANSMISSION GREASES**

(Light—Medium—Heavy)

**VACUUM OIL CO.'S MOTOGREASE**

(Light—Medium—Heavy)

**VACUUM OIL CO.'S AUTOSPONGE**

(Light and Heavy)

**VACUUM OIL CO.'S MOBILUBRICANT**

(A cup grease—see statement in article above)

All are put up in 5, 10, 25 and 50 pound tins—in half-barrels and barrels.

Mobilubricant is also put up in handy one-pound tins, the grease being turned out with a key.

Our greases and our Gargoyle Mobiloils cover all requirements of automobile lubrication.

Gargoyle Mobiloils are put up in 1 and 5 gallon sealed cans—in half-barrels and barrels. All are branded with the red Gargoyle, our mark of manufacture.

**GARGOYLE**  
  
**Mobiloil**  
*A grade for each type of motor*

The various grades, refined and filtered to remove free carbon, are: Gargoyle Mobiloil "A," Gargoyle Mobiloil "B," Gargoyle Mobiloil "D," Gargoyle Mobiloil "E," Gargoyle Mobiloil "Arctic."

**VACUUM OIL CO.**

ROCHESTER, U. S. A.

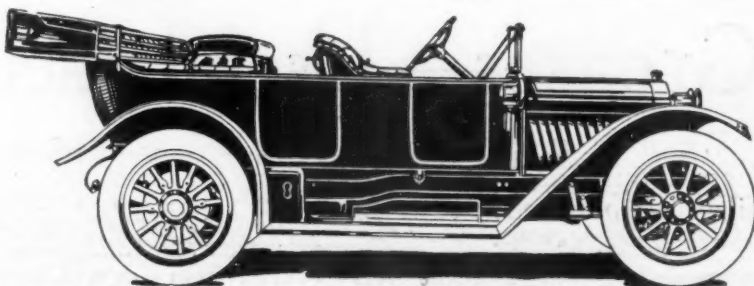
BRANCHES:

DETROIT: Ford Bldg.  
BOSTON: 49 Federal St.  
NEW YORK: 29 Broadway  
CHICAGO: Fisher Bldg.  
PHILADELPHIA: 4th & Chestnut Sts.  
INDIANAPOLIS: Indiana Pythian Bldg.  
Distributing warehouses in the principal cities of the world.



## Real Value versus Hot Air

44-50 7-PASSENGER CAR, ELECTRICALLY STARTED  
AND LIGHTED, \$2000.00



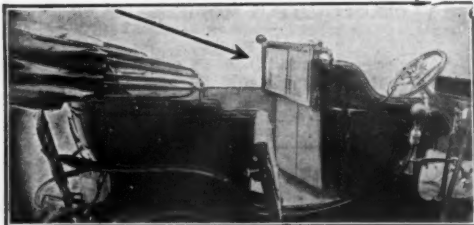
**Performance, Service, Economy, Comfort, Beauty, Electric Starting and Lighting**

THESE ARE THE REAL THINGS YOU, as a buyer, are interested in and can GET IN EVERY ABBOTT CAR, rather than extravagant and irrelevant claims regarding forced output, excessive floor space and number of technical persons employed, none of which, however, can compensate for short cuts in engineering or slights in material or workmanship often times resorted to to enable attractive selling prices.

NOTE THESE FEATURES — Electric Starting and Lighting with Magneto Ignition, Continental Standard Motors, Genuine Mercedes Radiator, Multiple Disc Clutch, Full Floating Axle, Timken Long Series Roller Bearings, Underslung Springs, Oversize Tires, 12" Turkish Upholstery, beautiful body lines with accessories up to the minute, combined with exact workmanship and critical inspection insure a value and "ability to go the road" not to be obtained with less quality or hot air.

There is no bunk and no junk in the Abbott Proposition. It's a trade winner and money maker.

## Abbott Motor Company, Detroit, Mich., U. S. A.



CLOSED VIEW

The  
**"J. H."  
Tonneau  
Shield**

(Patented)

A CLOSED CAR IN A MINUTE. LIMOUSINE COMFORT AT WINDSHIELD PRICE.

The Ideal shield for the women. Don't take the other fellow's dust. For the snow, rain or wind use

### *The "J. H." Tonneau Shield*

fits any car, easy to operate, it is exclusive and has a rich finish. Agents wanted for a real live accessory. Send for particulars

The  
**"J. H."  
Tonneau  
Shield  
Co.**

225 W. 49th St.  
New York City



OPEN VIEW

When Writing to Advertisers, Please Mention Motor Age.

## The Underwood Typewriter

**Has No Rivals**



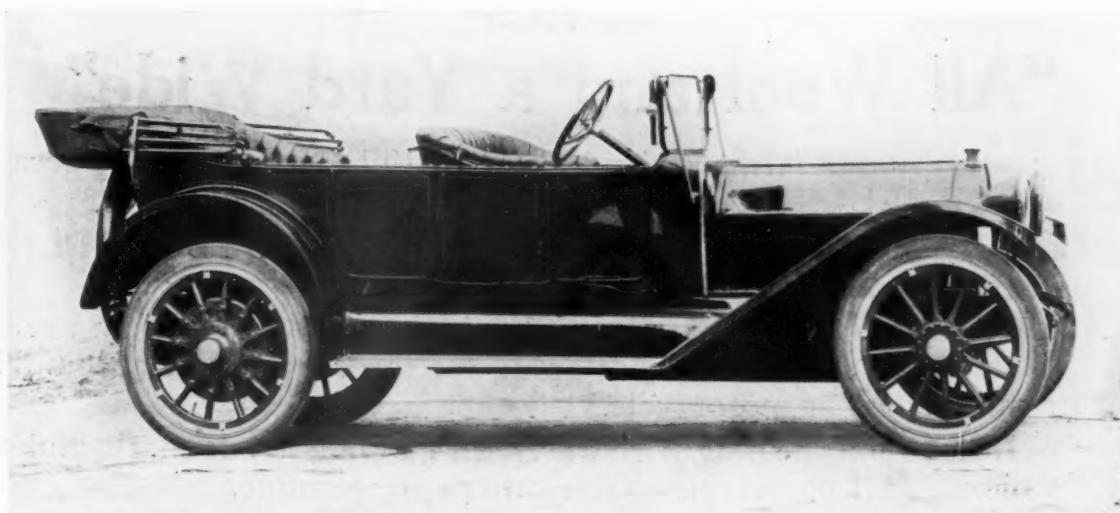
**In  
Speed  
and  
Accuracy**

It Holds All World's Records in Open Competition

*"The Machine You Will Eventually Buy"*

**Underwood Typewriter Co., Inc.  
Underwood Bldg., New York**

BRANCHES IN ALL PRINCIPAL CITIES



# A NEW SIX

by an Old Builder—at a Low Price

—de Soto Six

**\$2185**

You can pay more for  
a big six—

—But you can't get  
UNIT POWER  
PLANT THREE-  
POINT SUPPORT  
and DOUBLE  
FRAME in any other  
car regardless of price.

No wonder car buyers who were ready to spend \$3500 or \$4000 have hesitated when they heard of the de Soto Six—55 horse power—at \$2185.

Here are a few of the features that are convincing wise buyers: 55 h. p., long stroke motor, long wheel base, 11-inch clearance, 36x4 Firestone demountable detachable rims, self-starter, electric lighting, power tire inflator, 12-inch upholstery, center control. *Complete equipment* including built-in wind shield, top, curtains, dust cover, dial speedometer, electric horn, foot accelerator, extra rim, jack, necessary tools, etc.

*de Soto Six*

—You Dealers Want It Because Your Customers Do

The de Soto Six makes selling easier than you thought possible. Just the enumeration of the features—the impressive appearance of the car—a mention of the price—and your customer is enthusiastic.

The de Soto Six has *value* that you can demonstrate quickly. A powerful car—a beautiful car—a sellable car.

—A Live Proposition for Live Dealers

Write if you want a real Big Six priced for the man who expected to be contented with a four-cylinder car. The de Soto catches customers that you couldn't interest in any other car. Write to us regarding terms.

**de Soto Motor Car Co.**  
Auburn, Ind.



# SPLITDORF

"Always There"

## "All Wool and a Yard Wide"

has been said by our farmer friends of SPLITDORF PLUGS because SPLITDORF PLUGS never fail.

There is no "shoddy"—no skimmed detail in making SPLITDORF PLUGS gas-tight, soot-proof and unbreakable.

SPLITDORF PLUGS don't short-circuit or carbonize—they are the standard, "common-sense" plug for farm tractor or automobile, motorboat or motorcycle.

Insist upon the plug with the SPLITDORF trade-mark and the hexagonal porcelain. None others are genuine.

"New ignition for old" is a special exchange proposition of great interest to every owner of a gasoline motor that is not equipped with SPLITDORF up-to-the-minute ignition. Save time and money and write or call for particulars TODAY.



### SPLITDORF ELECTRICAL COMPANY

NEW YORK, 18-20 West 63d St.  
BOSTON, 180-182 Massachusetts Ave.  
PHILADELPHIA, 1338 Cherry St.  
KANSAS CITY, 1823 Grand Ave.  
CHICAGO, 64-72 E. 14th St.

Factory: Newark, N. J.

DETROIT, 868 Woodward Ave.  
ATLANTA, 8 Harris St.  
SAN FRANCISCO, 1028 Geary St.  
LOS ANGELES, 1228 S. Olive St.  
SEATTLE, 1628 Broadway.  
LONDON, BUENOS AIRES.

## Just What You Need

# The Automobile Catechism

*Its Scope Has Been Broadened*

*Its Size Has Been More Than Doubled*

*Its Fund of Information Has Been Enlarged*

THE demand for this most comprehensive work has encouraged its publishers to produce in this edition a work filled with terse, plain information, covering every possible question which may arise in your automobiling experience.

Car owners will find it a book of instruction, leading them from the first principles of driving, care and maintenance into the high realms of expert knowledge.

The Automobile Catechism treats of the automobile in modern form and of all of its troubles that may be remedied by the driver. IT ASKS THE QUESTION—THEN ANSWERS IT.

**Revised Edition, 264 pages. Bound in Morocco. Price, \$2.50, Prepaid**

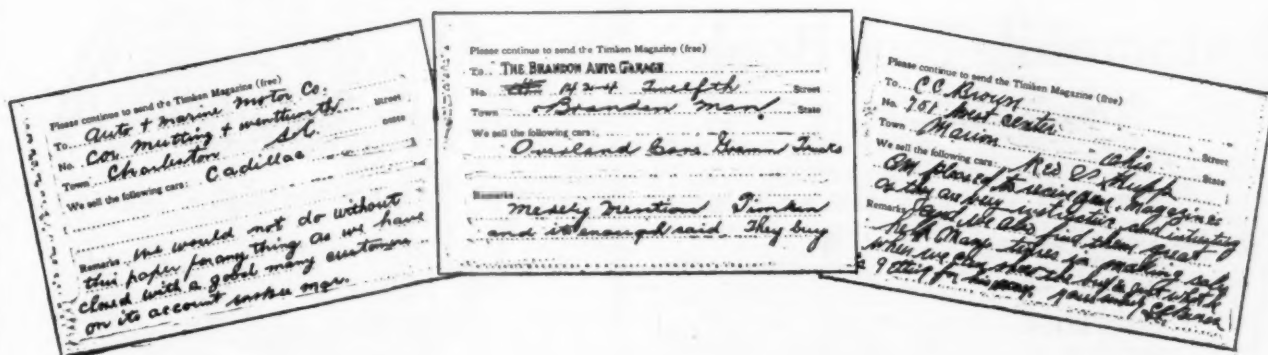
**THE CLASS JOURNAL CO.**

910 S Michigan Avenue

CHICAGO



"It is as necessary as your headlight," because it lights your way to necessary knowledge, which all owners and drivers should possess.



## Garage Men Everywhere Say Timken Bearings and Axles Help Them Sell Cars

Thousands of Garage owners have said this.

In the March issue of the Timken Magazine was a post-card. Garage men were asked to sign the card if they wanted to continue receiving the magazine. Their opinions of Timken Axles and Bearings were not asked. Yet thousands wrote on the cards sentences that varied in form only. They said

**"Timken Bearings and Axles help us sell cars!"**

These men handle and repair all makes of cars, both pleasure and commercial. They know from wide experience it's never necessary to defend *Timken*.

Three cards are reproduced above. Extracts from a few others printed below.

### Contains Valuable Information

"Thank you for the Timken Magazine. We find therein much information which is of value to us in selling cars." Meili-Blumberg Co., Maxwell, Marion, Kissel Kar, R. C. H. and Ford Agents, New Holstein, Wisconsin.

### Supplies Pointers for Sales Work

"The Timken Magazine supplies us with many pointers to use in our sales work," says the John Deere Plow Company, Kansas City, Missouri, southwestern distributors of Velie cars.

### Timken Stands for Service

"I always advise customers who demand service to buy Timken-equipped cars." Wm. F. McHugh, repair man, Detroit.

### Salesman Says it Helps

"I read every copy of the Timken Magazine through and through and then preserve it. I find it a great help in selling cars." Geo. P. Ames, salesman for the Burtiss Garage, agents for Peerless, Chalmers, Kirt Cars, Moore delivery wagon and Universal Trucks, Schenectady, N. Y.

### Strongest Talking Point

"Timken Roller Bearings are the strongest talking point for the motor car agent." R. L. Jacobmeyer, Lozier, Mitchell and R. C. H. agent, Poplar Bluff, Missouri.

### Best Selling Argument

"Timken Axles and Bearings are the best selling argument I have." C. A. Winter, Cole Agent, Wellsville, Kansas.

### No Trouble in Four Years

"We have been using Timken Axles and Bearings in Haynes Cars for four years and haven't had a bit of trouble. They please our customers and there are no 'come backs'—Columbia, Mo., Automobile Co., Cole, Haynes, Overland, Mitchell and Hupmobile agents.

### Everybody's Doin' It!

"Everybody's doin' it! Doing what? Recognizing Timken Axles and Bearings as the standard of the world." Tyler Motor Company, agents of Overland and Pullman Cars, Sistersville, West Virginia.

### Helps to Sell Cars

"Long live the Timken Magazine. I show it to customers and it helps me sell cars." C. E. Gethy, Case and Reo Agent, Shelby, Michigan.



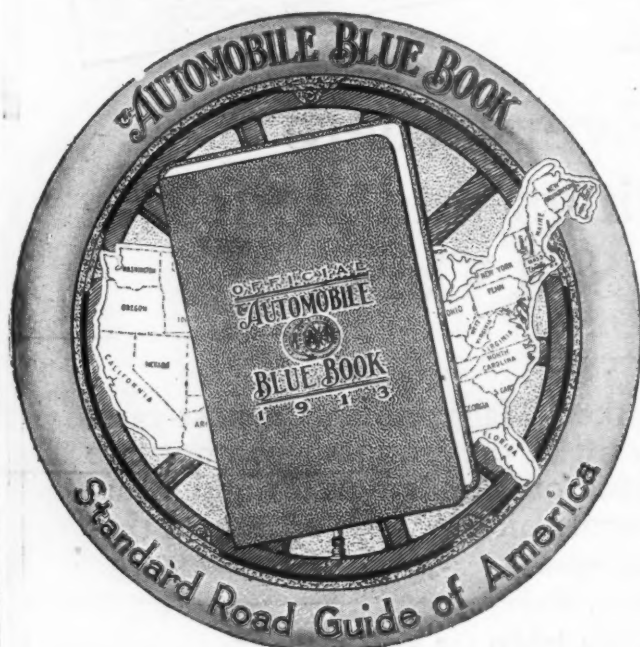
**The Timken Roller Bearing Company**  
Canton, Ohio, U. S. A.



**The Timken - Detroit Axle Company**  
Detroit, Michigan, U. S. A.

*The 1913 Edition*  
**Automobile Blue Book**  
 is now on sale

Expanded and improved with new and complete maps and thousands of miles of new roads, the Books fittingly mark the latest step in eleven years of progress.



The "good roads" movement has attained such proportions in the past year that the network of highways throughout the country has required a very complete re-charting. This has imposed a heavy task on the Automobile Blue Book's field staff. The motoring public must judge how successfully the situation has been handled.

*Bound in royal blue flexible leather.*

On sale today at good book stores, leading automobile supply houses, many hotel newsstands, and at all Blue Book Touring Bureaus. Or sent prepaid upon receipt of price.

Volume 1, New York and Canada - - - Now ready  
 Volume 2, New England and the Maritime Provinces - - - Now ready  
 Volume 3, New Jersey, Pennsylvania and the Southeast - - - Now ready  
 Volume 4, The Middle West - - - Now ready  
 Volume 5, Mississippi River to the Pacific Coast - - - Now ready

—\$2.50 per volume—

**The Automobile Blue Book Publishing Company**

908 Michigan Ave.,  
 2162 Broadway,

Chicago  
 New York



## Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

**Eighth Annual Convention of the Federation of Trade Press Associations in the United States at the Hotel Astor, New York, Sept. 18, 19, 20, 1913.**

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

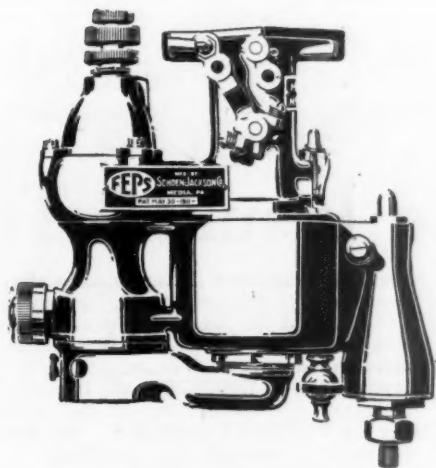
**The Committee of Arrangements**

Wm. H. Ukers, Chairman, 79 Wall St., New York

**The Federation of Trade Press Associations  
 in the United States**

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago





# FEPS

"A Giant in Power—A Miser in Fuel"

**T**HE Feps Carburetor will give to any car a remarkable increase in power and speed with far greater flexibility of motor. It will increase your mileage per gallon of fuel from 25% to 50%. It will handle any grade of gasoline and is unaffected by changes of weather or temperature. The first adjustment is final. It also embodies a never-failing device for quick starting.

To anyone who has not actually tried the Feps these claims will no doubt appear extravagant. That they are justified, however, is proven by the fact that thousands of carburetors have been sold during the last few months in all parts of the country as a direct result of its remarkable performance. Enthusiastic dealers and users have been our best advertisement as evidenced by the large number of repeat orders invariably received wherever the Feps is introduced.

## Schoen-Jackson Co., Media, Pa.

Write Dept. "G" for illustrated descriptive booklet.

### FEPS DISTRIBUTORS AND SERVICE STATIONS:

Baltimore: Carl Spoerer's Sons, 901 S. Carey St.  
 Rochester: Auto Repair Co., 55 East Ave.  
 Wilmington, Del.: Ayers' Garage, 11th and West Sts.  
 Wichita: Hockaday Auto Supply Co., Wichita, Kan.  
 Washington: Miller & Dudley Co.  
 New York: Factory Branch, 1777 Broadway  
 Phila., Pa.: Fischer Auto Supply Co., 1415 Filbert St.  
 Boston: Motor Supply Shop, 883 Boylston St.  
 Pittsburg: Automobile Supplies Co., Hartje Bldg.  
 Cleveland: E. A. Hammer Co., 1839 Euclid Ave.



## Try This Experiment!

**E**QUIP your car with ALL-IN-ONE SPARK PLUGS. Open the pet-cock of one of the ALL-IN-ONE PLUGS. Inject a few drops of kerosene into the cylinder by means of this pet-cock. Close the cock and start your motor.

Now take a clean handkerchief and hold it above the pet-cock the moment you open it. The handkerchief will be literally "black as soot" with the carbon blown out.

### All-In-One Plugs Do Your Decarbonizing For You

Treat each of your cylinders with kerosene in this manner after every run, and you will never again be troubled with a carbon-congested motor—or sooty sparking points. ALL-IN-ONE PLUGS used as recommended keep a motor sweet and clean-running for life. They make the use of costly and often injurious carbon removers absolutely unnecessary.



No more sending your motor to the repairman to have carbon deposits "scraped" off. You do your own decarbonizing at home, on your own time, at the cost of a few drops of kerosene.

Keep your motor at its highest efficiency with ALL-IN-ONE PLUGS. They cost no more than the other kind.

Price \$1.25 Each

Frontier Specialty Co. 539-543  
 Ellicott St. Buffalo, N. Y.

# Milwaukee MOTORS

## Famous for their Silence

You have seen cars with the "ague"—with shivering vibrations running up and down them from radiator to tail lights—with power plant pounding under the hood. The car with the "ague" is on the short road to the scrap heap.

All this noise and vibration has been designed out of MILWAUKEE MOTORS. It took years of experimenting to do it, but scientific engineering triumphed in the end.

The life of a car is no longer than that of its motor. MILWAUKEE MOTORS because of their silent, vibrationless action have no superior in point of longevity. Cars which carry them enjoy long service, because their vital parts are not shaken and jolted into disrepair.

MILWAUKEE MOTORS are made in all sizes for all requirements—for both pleasure cars and trucks. They are furnished as Unit Power Plants or without transmission, clutch and control. Built to accommodate any standard transmission. Can be equipped with any standard electric lighting and starting device.

### BUILT IN THE FOLLOWING SIZES

#### 4-CYLINDER MOTORS

- 4 5/16x4 1/2, Unit Power Plant or Alone, Cylinders Cast in Pairs.
- 4 1/2x5 1/4, Unit Power Plant or Alone, Cylinders Cast in Pairs.
- 4 3/4x5 1/4, Unit Power Plant or Alone, Cylinders Cast in Pairs.
- 4 3/4x6, A Special Truck Motor. Cylinders Cast in Pairs. Not furnished as Unit Power Plant.
- 4 1/2x5 1/2, Unit Power Plant or Alone, Cast en Bloc. For Pleasure Cars and Light Trucks.

#### 6-CYLINDER MOTOR

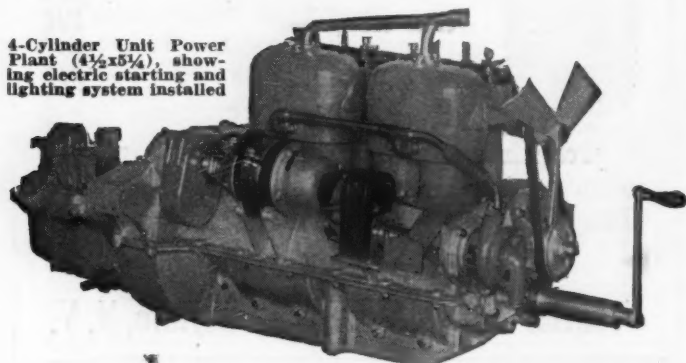
- 4 1/2x5 1/2, Unit Power Plant or Alone, Cast en Bloc.

WRITE FOR DESCRIPTIVE MATTER

## Milwaukee Motor Co.

MILWAUKEE, WISCONSIN

4-Cylinder Unit Power Plant (4 1/2x5 1/4), showing electric starting and lighting system installed



## The Insured Tire

There is much uncertainty in tire quality these days, and "tire insurance" is a timely topic. Figure what an INSURED TIRE would be worth to you, Mr. Dealer. Figure what it would be worth to you in satisfaction—in future business—in dollars and cents.

Every Marathon tire is INSURED. We insure it in our factory. We insure mileage and service and satisfaction, by building-in the TOPMOST QUALITY. We insure the Marathon tire by slow, careful, hand building.

Those are reasons, Mr. Dealer, why we can guarantee Marathon for 4,000 miles. Those are reasons why Marathon tires give an average service of FAR MORE than 4,000 miles.

And those are reasons why you should sell Marathon tires.

### Building by Hand

Hand building is the most expensive method. It is the best method, and that's why we build Marathon tires by hand.

Cost is not considered in the building. Quality—service to users—is the first and only consideration.

Our hand building insures utmost accuracy. It prevents all errors. It insures a perfect tire.

### Top-Test Materials

Only top-test materials are used. We use genuine Sea Island fabric. This is the costliest and best fabric known.

For Marathon tires, this fabric is so woven as to permit of complete impregnation of the rubber. Each thread, thus surrounded by rubber, prevents cutting out.

It retains the life and strength of the fabric indefinitely. And it prevents fabric separation.

And then only the finest rubber is used.

No cost is spared to make Marathon the top-most quality tire.

### Heaped-Up Wear

In Marathon tires, we heap-up the rubber in the center of the

tread—make it thickest where the most wear comes. So there is no waste.

That exclusive Marathon feature in itself means extra mileage.

### Angle Non-Skid Tread

Note the angle non-skid tread. Note how the angles grip in every direction. They won't let go. They can't.

Underneath the angle tread is a thick, plain tread. The two treads together give extreme mileage. Both treads are of finest rubber, made extremely tough by our secret formula.

So the heavy sharp angle tread is very lasting in itself.

### Sell This Tire

If you want to give your customers the utmost in tire-mileage, service and satisfaction, sell the Marathon tire.

Full satisfaction to your customers means full satisfaction to you. It means greater business—more money at the end of the year.

Write us for full details. We want you to sell Marathon tires. Ask for a section. That will confirm our claims. That will convince you. Write now.



## The Marathon Tire & Rubber Company

Cuyahoga Falls, Ohio

DISTRIBUTORS IN MOST LARGE CITIES (1003)

## Gas-Car Dealers Should Know

The  
LUXURIOUS  
**BROC**  
ELECTRIC

**O**WNERS of high-grade gas-cars are today the largest buyers of electrics. As a dealer in gas-cars, that should mean much to you.

If your customers are satisfied with the gas-cars you've sold them, they'll naturally come to you for information or advice when they contemplate the purchase of an electric.

If you are not in position to sell electrics, at least be able to advise accurately and honestly on the subject.

The Broc is an excellent car—sturdy and strong in its mechanism, beautiful and artistic in its body-lines, convenient and comfortable in its service. Those who buy the Broc are enthusiastic in their praise of it.

Be the one to recommend the Broc, or better still, be the one to sell the Broc.

Several very profitable territories still open. Write for catalog, prices and terms.



**The BROC ELECTRIC  
VEHICLE COMPANY**

1675 Fortieth Street Cleveland

## HERZ PLUG



Eventually, you will disregard the cheap hardware commonly called "Spark Plugs," and use the HERZ PLUG—the only Plug that is or can be

### GUARANTEED A YEAR

The usual Spark Plug troubles are unknown to users of the HERZ PLUG. Once installed, it never is taken out.

#### Double Blue Enamel Stone

No Sooting — No Cleaning  
No Porcelain — No Breakage

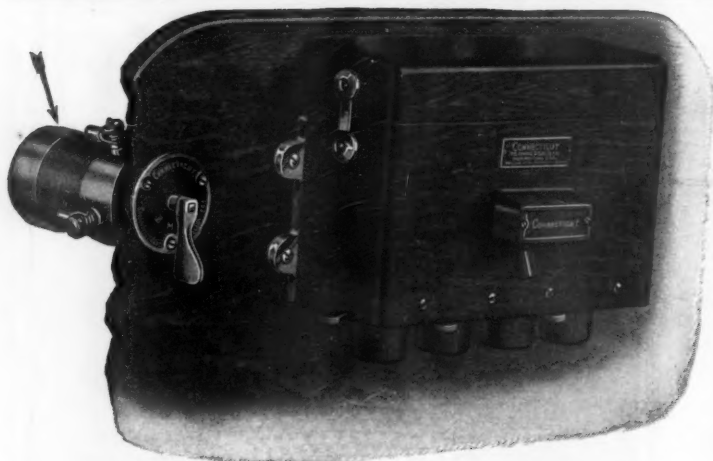
#### No Experiment: In its 20th Year

Price, \$1.50 postpaid. Ask your dealer, or write us

We also make the HERZ MAGNETO

**HERZ & CO. 295 Lafayette St., New York**





**CONNECTICUT**

## Master Vibrator For Ford Cars

This Master Vibrator frees the Ford owner from troublesome and frequent adjustment of coils. It also gives you a smoother running engine—increased power—less trouble in starting.

The Connecticut Ford Master Vibrator is the smallest and most compact made. It is mounted flush with the dash, the coil proper being located under the hood.

It is fitted with a standard Connecticut switch and is supported by three machine screws. Thus the installation is simple, easy and quick. After installation, the adjustment does not require attention more than two or three times a season.

Severe tests extending over a year have proved that the Connecticut Master Vibrator and Switch draws a minimum amount of current from the magneto. It gives perfect synchronism with an exceedingly hot spark.

Price complete \$9.00, at your regular dealer; or if unable to secure it from him, we will ship direct, all charges paid, upon receipt of price.

Write for descriptive circular No. 36

Connecticut Tel. & Electric Co., Inc., Meriden, Conn.

## Eighteen Thousand Miles

Without Renewing the Contact Points  
and with Only Three Adjustments

Springfield, Mass., Feb. 9, 1913.

Dear Sirs: Regarding the master vibrator coil fitted to my Ford car, I have nothing but praise to offer. This car has now run a little over eighteen thousand miles since this coil was installed. The vibrator points have been cleaned and squared up but three times since the coil was put on. I find also that this coil draws less current than the four vibrator type and am enabled to get better results from my electric headlights with it in the circuit than without. Kindly advise me when it is on the market, as I have four or five friends who have wanted one but have been informed that they were not on the market as yet.

Very truly yours,

EDWARD J. STONE.

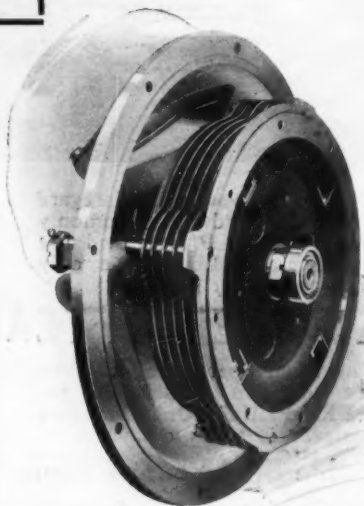


**TRANSMISSIONS**

**STEERING GEARS**



"The Value of our Product is not in its Price—But in the Service Rendered"



### Model K-12 Clutch

Dry plate, multiple disc type, raybestos faced discs.  
Extra large diameter and thickness of steel discs.  
Adaptable to unit type motors, with either rear axle or "mid-ship" transmission.  
Clutch housing stationary, bolts direct to motor housing.  
Extra heavy double coil spring used.  
Drive taken on hardened steel studs and hardened keys.  
All bearings of ball type sufficiently oiled.  
Plain bearing supporting shaft at rear, eliminated.  
Replaced by annular bearing, which takes axial thrust in either direction.  
Arrangement made for clutch braking, and pedal adjustment.  
Exceptionally light, compact and neat in appearance.

**Warner Gear Co., Muncie, Ind.**

Detroit Office—628 Ford Building



**DIFFERENTIALS**

**CONTROL LEVERS**



# ONE REASON WHY

Practically All the Leading Car Builders Are Large Users of



## GABRIEL

# Rebound Snubbers

Standard Equipment on the Easiest Riding Cars  
Peerless Stearns White

Easy to put on. No drilling or otherwise marring the car. Noiseless at all times. No further adjustment required and will outlast the car.

The true Snubber Principle found only in the Gabriel is perfectly adapted to modern high-set flexible springs, which require that the **up-stroke** be retarded gradually and without abrupt stop.

By gradually checking this up-stroke, Gabriels prevent car-body from bouncing up too high. They bring the springs back to normal position at once without the

repeated up-and-down motion of car-body so uncomfortable to passengers and injurious to mechanism of car.

Utmost riding-ease. Freedom from car repairs. Low up-keep expense and long service. Easy-riding on rough roads without interfering with spring action on smoother roads.

Treat yourself to a Demonstration. Let us send you catalog and name of our nearest dealer.

**GABRIEL HORN MFG. CO., 1415 E. 40th ST., CLEVELAND, O.**

Makers of the Famous GABRIEL Musical Horns and Auto Accessories.



PLANT No. 1. BERLIN, GERMANY.

## BALL ~ BEARINGS



HB DWF

**The Hess-Bright Manufacturing Company**

*Pioneers in the introduction of Annular Ball Bearings*

Most extensive resources and plants in existence devoted exclusively to ball bearing manufacture. Enlarging and improving facilities, product and capacity for distribution.

Main Offices and Plant No. 2 on line of Penna. R. R. to New York  
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CATALOGUE UPON REQUEST







PLANT No. 2. PHILADELPHIA, PENNA.

When Writing to Advertisers, Please Mention Motor Age.

## Spark Plug Troubles Ended on 400,000 Cars



If your spark plugs get dirty—

If they short circuit, carbonize or leak—

If they lead to weak ignition, or wear out—

You are using the wrong sort of spark plugs.

There's a patent plug called "Soot-Proof"—invented by C. A. Mezger.

It's the result of 12 years devoted to nothing but spark plugs.

Over two millions are now used on America's leading cars.

These plugs are guaranteed to be utterly trouble-proof. They clean themselves.

They never short-circuit. They never leak.

They are built with a double chamber. And they offer at least **three times** the resistance of any other spark plug made.

They last several times as long. Countless "Soot-Proof" plugs are in use today, after eight years' ceaseless service.

Don't say this sounds impossible. Try out these plugs and see.

Insert them and forget them. If they clog or balk, grow weak or short-circuit, ask for your money back. And bear in mind that hundreds of thousands have actually ended their spark plug troubles by using this Mezger plug.

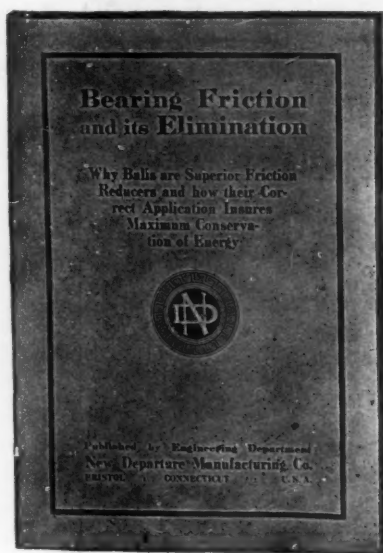
Get them from your dealer. If he can't supply, find a dealer who can. Or send to us direct. It is worth the effort to free yourself forever from the troubles with faulty plugs.

### C. A. Mezger "Soot-Proof" Spark Plugs

**C. A. MEZGER, Inc., 15 Canal Place, New York**

Philadelphia, 1427 Vine St., Petry-Cassidy, Inc.  
Chicago, 1430 Michigan Boulevard, F. E. Sparks  
Detroit, Ford Building, H. E. Butcher

Portland, 329 Ankeny St., Hughson & Merton  
Seattle, 924 E. Pike St., Hughson & Merton  
Los Angeles, 1229 So. Olive St., Hughson & Merton  
San Francisco, 530 Golden Gate Ave., Hughson & Merton



## Can We Send You a Copy of this Booklet?

Our Engineering Department has published the first of a series of booklets discussing the latest developments in the solving of bearing problems.

This first brochure is entitled "Bearing Friction and Its Elimination," and aims to show why balls are superior friction reducers and how their correct application secures maximum conservation of energy.

The types of bearings particularly discussed and compared in this writing are the ball and roller bearings, as applied to all bearing points in the motor car.

It discusses and explains the growing tendency among engineers and manufacturers to favor the ball type of bearing, as evidenced by the summarization figures published by the "Horseless Age" in a review of 1913 pleasure car models. These figures show that ball bearings are used in the differential of 53% of pleasure cars for 1913, as against 37½% of the 1912 models; in the transmission of 75%, as against 64%; and in the rear wheel of 52%, as against 42%.

This brochure will interest you. Copy will be mailed you promptly on request.

**The New Departure Manufacturing Company**  
**Bristol, Conn.**

**WESTERN BRANCH:**  
1016-17 Ford Building Detroit





## BOYCE MOTOMETER

PAT'S PEND'G  
The Radiator Heat Indicator

### WINS AT INDIANAPOLIS

**1st: Peugeot, GOUX—Motometer Equipped**  
**2nd: Mercer, Wishart—Motometer Equipped**

*Read what the WINNER says about it:*

"Gentlemen: Today I had the honor of winning for France the Great Indianapolis Race with my Peugeot car. I carried a MOTOMETER on my radiator cap and it worked perfectly throughout the race. It gave me the greatest feeling of comfort at all times to know that my cooling system was in perfect order and the MOTOMETER saved me those precious seconds usually consumed in removing the radiator cap to examine the height of the water.

"Heretofore, neither in racing nor touring, has there ever been any device to warn the driver of heating troubles, and I consider the MOTOMETER a most necessary device on any car.

"May I add, that even at the highest speed I had absolutely no difficulty in reading the red indicator. Faithfully yours, (Signed) GOUX."

EIGHTY per cent of the drivers depended upon the Motometer.

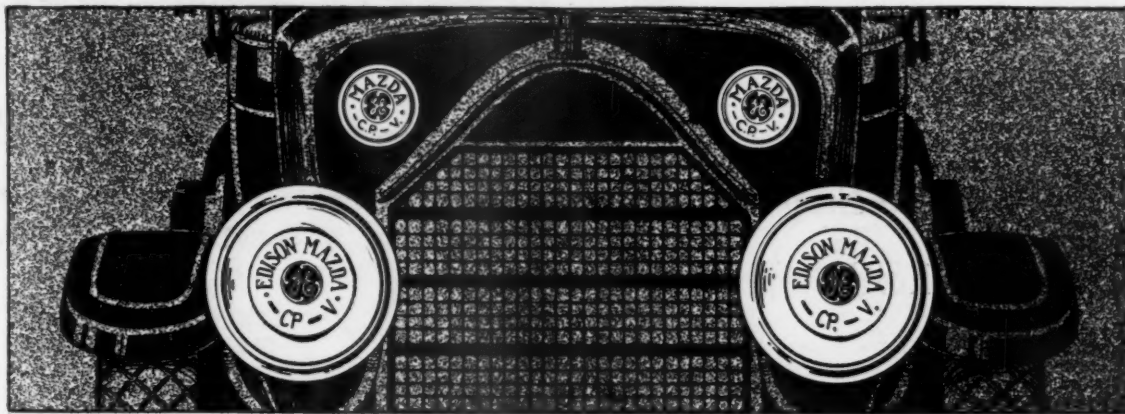
The Motometer Co.

1788 Broadway, New York  
Chicago: 1322 Michigan Avenue

Write for catalog



View from Seat



### All High Grade Cars Are Electrically Lighted

The good cars naturally have the highest type of equipment.

Heading the specifications of all the representative cars is—"electrically-lighted throughout," and the lamps used are invariably Edison Mazdas.

Car manufacturers recognize that to maintain sales and prestige, everything about the car, even down to the smallest details, must be right.

Whatever lighting system is adopted by car builders, the lamps are nearly always Edison Mazdas, because of

the successful and continued service they give the car owner.

It is this reliability and the efficient and satisfactory operation, under all conditions, that make the use of Edison Mazda Lamps so general.

The thick, strong filaments made from drawn wire tungsten are scientifically constructed so that a large volume of light issues from a small area. This concentrated light source enables the parabolic reflectors to give their maximum reflecting power.

Be sure the lamps you buy bear the name Edison.

## General Electric Company

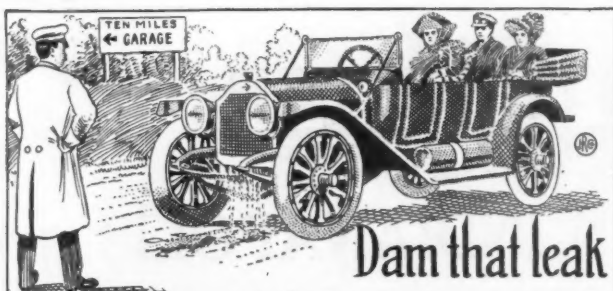
Edison Lamp Dept.



Harrison, N. J.

Lamp Agencies Everywhere

4215



## Dam that leak

Do it with Se-ment-ol. Pour it into your radiator. It dissolves in the water, flows thru the cooling system. Cooled by the air when it strikes the leak it congeals and cements the cavity making a permanent repair.

After the cement has "set" drain radiator and re-fill with fresh water.

**CARBONOX**—The logical carbon remover. Does not dissolve the carbon; but attacks the "charred" oil that binds the flakes of carbon to one another and to the metal. The loosened carbon is then blown out thru the exhaust.

Price 75¢ at dealers.

THE NORTHWESTERN CHEMICAL CO.  
Marietta, Ohio.

**SE-MENT-OL**  
SELF-ACTING RADIATOR CEMENT  
THE NORTHWESTERN CHEMICAL CO.  
MARIETTA, OHIO

## Make Your Car Inflate Its Own Tires!

Save Time, Tires, Temper—with a Taylor

The owner of a TAYLOR "NOIL" Tire Pump laughs at flat tires.

He simply throws a lever, attaches the hose and stands back and smiles while his engine does the work.

The TAYLOR is the only practical engine-driven tire pump on the market. Absolutely will not carry oil and oily vapors into tires.

Designed on practical lines; the only plunger and diaphragm type of engine-driven tire pump manufactured. Compact size, easiest to install, due to the special brackets we provide for its quick attachment.

Leading cars for 1914 are equipping with it.

Price, only \$30, including

gears, brackets, hose and pressure gauge—complete. Nothing else like it on the market.

The TAYLOR will save its cost twice over in one short season's use. Prolongs the life of tires from 33% to half. Makes it easy to maintain required tire pressure. Prevents escape of oil and oil vapors into "in-

ners." Comes in handy for dusting body and upholstery, as well as cleaning bearings, bushings and other mechanical parts of car.

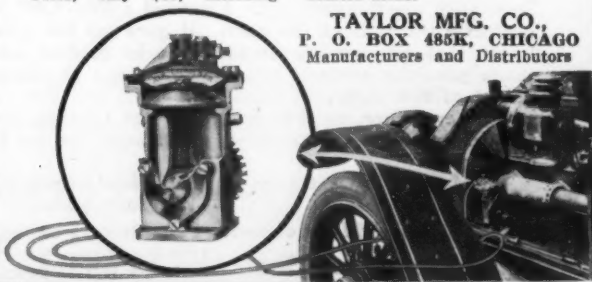
Write for information, stating make and model of your car.

**DISTRIBUTORS WANTED.** Garagemen and Automobile dealers, send for full particulars.

This pump is retailed through dealers alone.

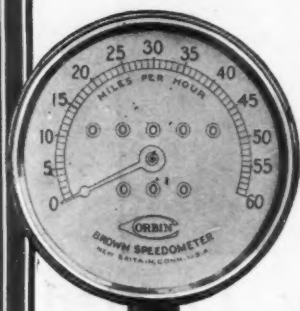
**TAYLOR MFG. CO.,**  
P. O. BOX 485K, CHICAGO  
Manufacturers and Distributors

**TAYLOR**  
"NOIL"  
TIRE PUMP



## IF A CORBIN-BROWN SPEEDOMETER

"The Speedometer of Absolute Accuracy"



Says  
**180 Miles**

The Map Says  
**180 Miles, if the  
Map is Right**

Write for catalogue

Corbin Screw Corporation Division  
AMERICAN HARDWARE CORPORATION

209 High Street NEW BRITAIN, CONN.  
BRANCHES: NEW YORK, CHICAGO, PHILADELPHIA  
Makers of the celebrated Corbin Coaster Brakes for  
Bicycles and Motorcycles



## Why the (K-W) Master Vibrator For Ford Cars?



Price, \$15.00

Because It Positively Gives  
**A HOTTER SPARK**  
**A SMOOTHER RUNNING ENGINE**  
**EASIER STARTING**  
**MORE POWER**  
**LESS CARBON DEPOSITS**  
**CLEANER SPARK PLUGS**

Over 42,000 Ford Owners Have Installed  
Them

and more are doing so every day. Watch the number grow monthly. Our Guarantee: Try the K-W Master Vibrator for 30 days and if you can get along without it return it and we will send you your money back and ask no questions. Send for folder.

Get (K-W) and that Satisfied Feeling



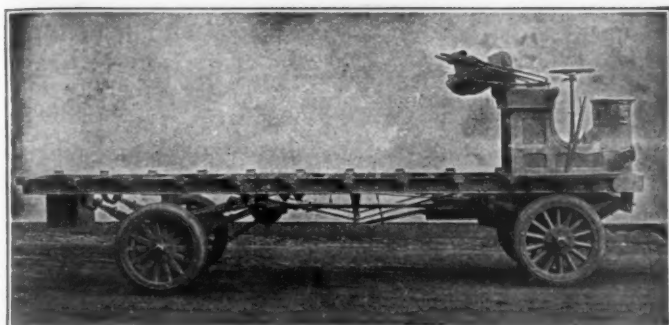
TRADE MARK  
**THE K-W IGNITION CO.**  
2835 Chester Avenue CLEVELAND, OHIO, U.S.A.

We make a complete line of ignition apparatus.

Agents in all Principal Cities

New York ..... E. J. Edmond, 1783 Broadway  
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# Johnson Trucks

1-Ton  
2-Ton — Chasses  
4-Ton

Write for Specifications

JOHNSON SERVICE CO., Milwaukee



## AUTO DEVICES LEAD THE WORLD FOR EFFICIENCY AND ECONOMY

SUPPLIED BY DEALERS EVERYWHERE

**MONDEX-HELIX GAS MIXER  
REDUCES YOUR GASOLINE  
BILLS 25 to 40 PER CENT**

ON AND AFTER JUNE 15th  
PRICE OF MONDEX-HELIX  
WILL BE \$5.00 FOR ALL SIZES

**MONDEX SHOCK PREVENTER  
REDUCES YOUR REPAIR  
BILLS 100 PER CENT**

Saves wear and tear of tires and eliminates all vibration.

Motor Car Racing says: "Mondex Shock Preventers proved they are right in the highest court of mechanical test known." Write for Booklet "N."

Agents Wanted Everywhere

THE ARISTOS CO., 250 W. 54th St., N. Y.



## Why Your Watch and Automobile Are Alike

Your watch, we will say, costs \$50.00—your automobile 15 to 50 times as much and maybe more. Yet, you wouldn't think of treating your watch like you do your automobile.

When your watch needs oil, you send it to a jeweler, who puts in a high-grade specialty oil. And the jeweler keeps this oil in an hermetically sealed container and puts it on your watch under a dust-proof glass cover—guarding every move so as to keep it free from contamination, dust, evaporation, etc.

## When You Oil Your Motor

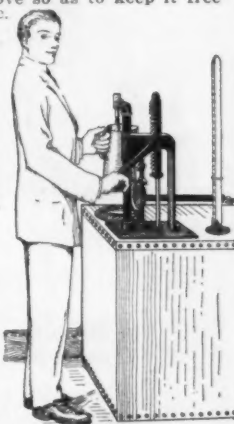
You ordinarily hurriedly pick up a container, look to see if anything is in it—pour out a quart or more from a half-corked 5 or 10 gallon tin can that has an air hole punched in it and repour this mixture into your car. Maybe you notice a black speck or two floating around, but you are in a hurry and it never occurs to you that this is destructive grit.

Then you wonder

## Why a Bearing Becomes Loose

or the noise of the car increases, etc. Why not look to your lubricating oil storage for your car that costs so much more than your watch and needs the same careful attention? Isn't this worth your while?

But let us tell you more about this interesting subject. Write for descriptive literature.



## S. F. BOWSER & CO., Inc.

Home Plant and General Offices,  
Box 2126, FT. WAYNE, IND., U. S. A.  
Sales Offices in all Centers and Representatives  
Everywhere

Original patentees and manufacturers of standard, self-measuring, hand and power driven pumps, large and small tanks, gasoline and oil storage and distributing systems, self-registering pipe line measures, oil filtering and circulating systems, dry cleaner's systems, etc.

ESTABLISHED 1885

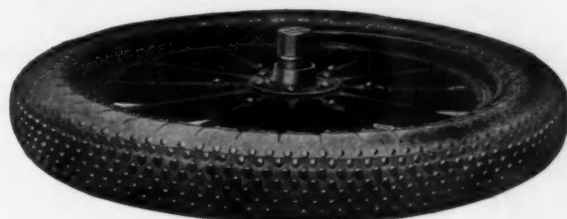
## Your Tires will now last 3 Seasons

—instead of one

5000 miles over the worst roads without puncture positively guaranteed. Skidding eliminated without injury to tires. Entire cost of car upkeep slashed in half.

WRITE TODAY FOR ABSOLUTE PROOF, INCLUDING FREE SAMPLE OF NEW IMPORTED LEATHER, STEEL RIVETS, INTERESTING BOOKLET, MOST REMARKABLE GUARANTEE EVER ISSUED, FREE TRIAL PLAN AND SPECIAL DISCOUNT.

Durable Treads are built on an entirely new principle. They answer every objection to treads in general, yet realize the ideal for which treads were intended.



No matter how old or worn out your tires are, don't throw them away. Durable Treads will make them last an extra season. If you have new tires, Durable Treads will make them last three seasons instead of one. But space does not permit our telling you the whole wonderful story here. Write today to nearest depot for proof, samples, booklet, remarkable guarantee, special discount and trial plan. A postal will do—give your tire sizes.

## THE COLORADO TIRE & LEATHER COMPANY

1024-A Karpen Bldg., Chicago. 435-A Golden Gate Ave., San Francisco  
524-A W. 34th St., New York City 1344-A Acoma St., Denver, Col.





## BETHLEHEM

### FIVE POINT SPARK PLUG

*Gives More Power to the Motor*

The Bethlehem Five Point Spark Plug equals  
4 Plugs in Each Cylinder!

Explodes all the gases. Economizes fuel.  
Gives Certain Ignition. Equally suited for all  
types of Engines.

Guaranteed for the Life of the Car.

Three Sizes:  $\frac{7}{8}$  in.  $\frac{1}{2}$  in. Metric. \$1.25 each.

At all dealers or by mail.  
Illustrated Booklet sent on request.

**THE SILVEX COMPANY**  
SIXTY WALL STREET  
NEW YORK




## Neither Rain, Mud Nor Dust Can Harm

your luggage when it is  
carried in the new rain-proof, water-proof

# Kamlee Auto Trunk

*"Made by Trunk Makers Who Are Motorists"*

Embodies every desirable feature—strength, lightness, durability, beauty. It adds to rather than detracts from the appearance of any car.

Consider these exclusive Kamlee features before you buy an auto trunk, then you'll surely select a Kamlee: patent drop front—no lifting of lid—patent inter-locking edge makes it air-tight, dust-proof, rain-proof; no straps to bother with in opening; fitted with standard suit-cases permitting removal of one party's luggage without disturbing others.

Ask Your Dealer or write us for price and descriptive circular. If your dealer can't supply you, we'll gladly ship you a Kamlee on approval.

**THE KAMLEE CO.**  
234 Broadway, Milwaukee, Wis.

Look for the Red and  
Gold Diamond  
Inlaid Right on  
Front Cover

## EQUIP YOUR CAR WITH A "PRESTO"

### ELECTRIC CIGAR LIGHTER ELECTRIC REPAIR LAMP ACETYLENE LAMP LIGHTER **3 in 1**

When you want to smoke, simply press the larger button and light a cigar or cigarette. Wind, speed or weather makes no difference. No stopping to light up. New design, handle of Rosewood finish, nickel plated reflector, pure platinum cigar lighter tip. Polished ivory finish push buttons—a handy exploring lamp.

It is six volt electric—furnished with 10 feet silk cord, absolutely safe, no danger of fire. No striking matches or removing side lights. The "Presto" is always at your elbow and within easy reach of everyone in the car. Durable, economical and efficient. Adapted to automobiles, electric vehicles, electric and gasoline launches.

Price complete..... **\$3.50**

**Presto Cigar Lighter Only**

A boon to the smoker—just press the button—light your cigar going at any speed—no wind too strong to bother. Well made, handle and parts same as above—neat and attractive—nothing to get out of order. Pure platinum cigar lighter tip and with 10 feet of silk cord. Price complete..... **\$2.50**

Cut shows a highly polished holder which can be placed on dash, in the tonneau or any other convenient place in the car. Price 25c.

Buy of your dealer or sent prepaid upon receipt of price

Price **\$2.50**  
"Presto" Lighter only. Showing operation of holder.

Sole Manufacturers  
**METAL SPECIALTIES MFG. CO.**  
736 W. Monroe Street, Chicago, Ill.



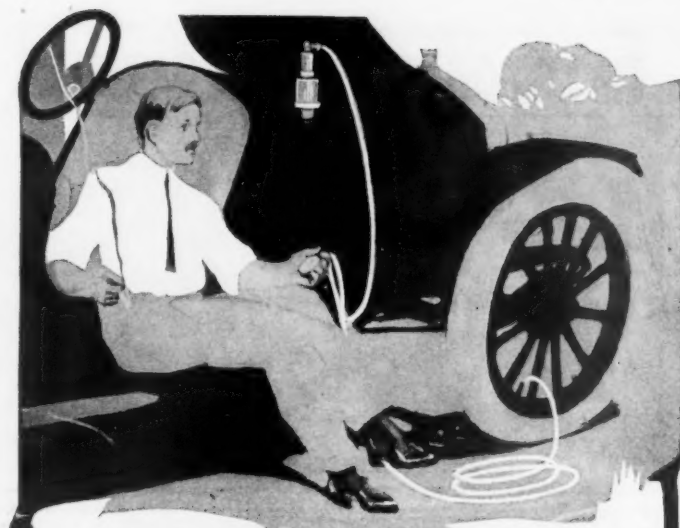
## The Way to Decide

If you are in the market for a horn and your dealer shows you a dozen or more styles, just ask him to sound them for you and it's "dollars to doughnuts" you'll pick the

# REACTO

The horn with the effective  
tone—does not screech or  
squawk

Send for Booklet 158 M  
**THE HOLTZER-CABOT ELEC. CO.**  
Brookline, Mass.  
Chicago, Ill.



## MAYO SPARK PLUG PUMP

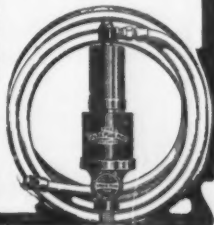
A simple and powerful pump adaptable for use on all cars from the smallest Ford to the largest Lozier. Instantly attached by substituting it for a spark plug. Pumps nothing but pure, fresh air. Inflates the tire in from 2 to 4 minutes. Built with metal rings like your engine and will last as long. Requires no attention other than an occasional drop of oil.

Weighs only 2½ pounds. Furnished with adapters to fit any car, 12 feet of hose and connections. Price \$10.00. With Pressure Gauge, \$2.00 extra.

You can try it on your own motor before purchasing

The Mayo Mfg. Co.  
55 E. 18th St., Chicago

**\$10<sup>00</sup>**



## You get the fattest spark with a J-M SPARK PLUG

This means that a larger percentage of the mixture is ignited—that you practically eliminate "back-fires"—and that you get more power out of your motor. In a recent test, 58 horsepower was the greatest power developed by a motor using various well-known spark plugs. Yet when using J-M Plugs under exactly the same conditions, this motor developed over 62 horse-power!

J-M Spark Plug gives the fattest spark for three reasons: First, it is doubly insulated—no chance for leakage of current; second, the center electrode offers the least resistance to the flow of current; and third, the firing points are made of platinum-iridium and nickel-alloy and offer the greatest resistance to the current without becoming overheated themselves. The J-M Spark Plug can be used either for battery or magneto ignition. Sold by most dealers. Shipped direct if your dealer doesn't sell it. Price \$1.00 each.

Write Nearest Branch for Illustrated Booklet

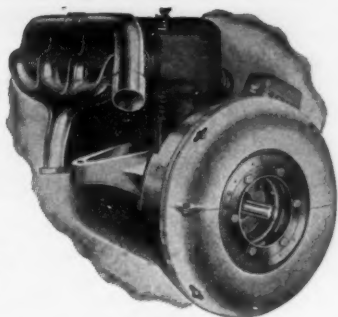
### H. W. JOHNS-MANVILLE CO.

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THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED  
Toronto Montreal Winnipeg Vancouver



U-S-L



U-S-L

## Takes the place of the Fly-wheel

The U-S-L Electric Starter and Lighter is a combination motor and generator that takes the place of the fly-wheel. The armature of the motor-generator is bolted directly to the engine crank-shaft.

The U-S-L doesn't add a single extra moving part to a car.

No gears or chains	No extra clutches
No added weight	Starts at a push of foot-button
No bearings to oil	Supplies ample current

Adopted by

Rambler, Overland, Garford,  
Edwards-Knight, Moyer, S. G. V.

Write for Bulletin 501

### The U. S. Light & Heating Co.

General Offices: 30 Church St., New York

Branch Offices and Service Stations—New York, Boston, Buffalo, Cleveland, Detroit, Chicago, St. Louis, San Francisco.



## False Mileage

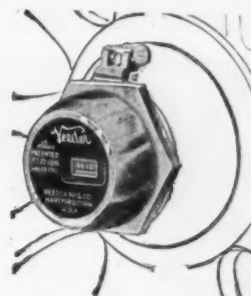
eats into the very foundation of the upkeep of pleasure and commercial vehicles. A VEEDER HUB ODOMETER is the positive watchman for tire, gasoline or "juice" mileage—it can't be fooled.

Neat, durable and compact, it can be easily attached. Price complete, **\$25.00**

At your dealer's direct from our factory or at the following agencies:

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Bernard J. Bill, 543 Golden Gate Avenue, San Francisco, Cal.



### The Veeder Manufacturing Company

C. H. VEEDER, President D. J. POST, Treasurer  
H. W. LESTER, Secretary  
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachometers, Counters and Small Die Castings



## B. A. Gramm's Motor Trucks

Newest Designs; Latest Improvements; Built in every detail to insure satisfactory and permanent results.

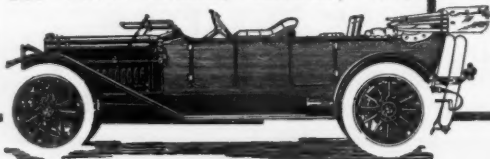
Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

**The Gramm-Bernstein Co.**  
Exclusive Motor Truck Builders  
Lima, Ohio, U. S. A.

## KISSELKAR

Every part built in the KisselKar plant, which is equipped with every facility for economical manufacture. All KisselKars have extra liberal wheelbase and roomy tonneau unsurpassed by any car at any price for comfort and capabilities. Write for catalog.

KISSEL MOTOR CAR CO.  
121 Kissel Avenue, Hartford, Wis.



"Thirty"  
"Forty"  
"Fifty"  
60 h.p. "Six"

KisselKar prices include full equipment—self-starter, top, windshield, demountable rims, speedometer, electric lighting equipment, shock absorbers, etc.

## HAYWOOD STEAM VULCANIZERS

THE PROFIT MAKING PLANTS



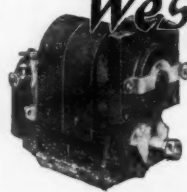
The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from  
\$25 to \$500

Write for Catalog B.

HAYWOOD TIRE & EQUIPMENT COMPANY  
524 N. Capitol, Indianapolis, Ind.

## Western Electric



PITTSFIELD

IGNITION  
APPARATUS



Brings Out the Good Points of  
Your Car! Test It Yourself!

Write our nearest house

Manufactured by  
PITTSFIELD SPARK COIL CO.

Distributed by  
WESTERN ELECTRIC COMPANY  
Offices in all principal cities

## Cross-Rolled Steel Springs Cut Up-Keep

In this new process, the steel is worked both longitudinally and transversely. So we get superior strength, toughness, resiliency. We use this process exclusively in our Chrome-Vanadium Brand of Springs. Find out more about them. It will make a tremendous difference in the riding qualities of your car.



In five years we have not had one Cleveland-Canton Chrome-Vanadium Spring returned to us by reason of breakage or settling. Let us send you full particulars.

Best Grade—Chrome-Vanadium  
Next Best—Special Analysis

The Cleveland-Canton Spring Co., Canton, Ohio, U.S.A.

## Corcoran Lamps

GAS, OIL, AND ELECTRIC

CORCORAN LAMP CO.  
CINCINNATI, O.



Patented

a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

**The Sparks-Withington Co.**  
JACKSON MICHIGAN - WALKERVILLE CAN.

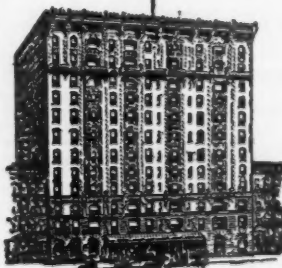
Manufacturers Don't omit a SPARKS-WITHINGTON Fan from your 1913 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's

You Can Walk From There to Anywhere.

## THE WOODSTOCK

The Hotel of Comfort

43rd St., Just East of Broadway, New York



Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates  
From \$2.50 to \$4.00 Per Day  
**W. H. VALIQUETTE**  
MANAGER

Also The Berwick, Rutland, Vt.





## RAJAH GIANT PLUG

Extra strong and heavy. Perfectly simple—only four parts, which are easily taken apart for repairs or replacement. Only highest grade, imported, hard fire porcelains used. Minutely accurate, well finished machine work. No thumb screws—a Rajah Clip Terminal supplied with every Plug. Price, \$1.50 postpaid—the most economical Plug made. Send for catalog.

Rajah Auto Supply Co., Bloomfield, N. J.  
John Millen & Son, Ltd.—Montreal, Toronto,  
Vancouver, Winnipeg.

## WINNIPEG

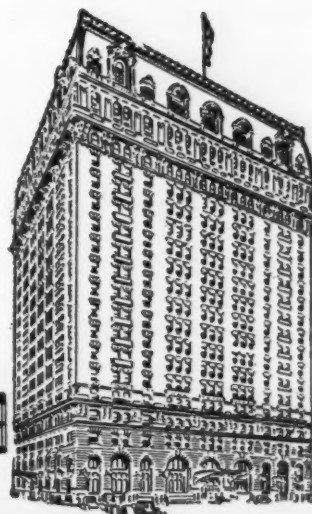
WANTS

### AUTOMOBILE AND TRUCK FACTORIES

THE remarkable growth of the cities, towns and agricultural districts in Western Canada has created an UNPRECEDENTED DEMAND for MOTOR DRAWN VEHICLES of ALL KINDS. Winnipeg wants these factories and offers the best labor market in Canada. Electric power and light from 60,000 municipal plant at cost, cheap sites, low taxation and best distributing facilities in all Canada.

THIS IS YOUR OPPORTUNITY  
RIGHT NOW IS THE TIME WINNIPEG IS THE PLACE  
Reports furnished free on the manufacturing possibilities of any line of industry

Write CHAS. F. ROLAND, Commissioner, Winnipeg, Can.



## Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

### RATES

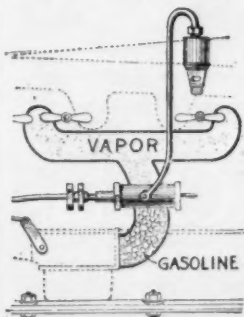
ONE PERSON	Room with detached bath.....\$2 to \$3 per day
	Room with private bath.....\$3 to \$5 per day
TWO PERSONS	Room with detached bath.....\$3 to \$5 per day
	Room with private bath.....\$5 to \$8 per day

### TWO CONNECTING ROOMS WITH BATH

Two persons	.....\$5 to \$8 per day
Four persons	.....\$8 to \$15 per day
SUITES	.....\$10 to \$35 per day

LA SALLE AT MADISON STREET, CHICAGO

## Gasoline Bills Cut Down 25% to 50%





The Parsons Automatic Gasoline Saver quickly saves its cost to owners of cars, motor boats and stationary motors. We guarantee not less than 25 per cent efficiency gain. Many cars now showing 50 per cent gain with actual road work tests.

\$6.50 complete—can be installed by any ordinary workman. Give H. P. of motor in ordering.

Agents now being given exclusive territory. The thousands of prospects make such an agency a gold mine.

THE PARSONS MFG. CO., Toledo, Ohio

## Cut Gears of Quality Complete Differentials

 **NEW PROCESS**   
**GEAR CORPORATION**  
SYRACUSE, N. Y.

## Dividend Payers!

For Dealers who know

## Harris Gasoline Gauges Wolf Gasoline Mixers

The Specialties with the  
Little Price and Big Profits

Write Today for Yours

## Approved Auto Specialties Co.

Dept. B, 1731-37  
Broadway, New York

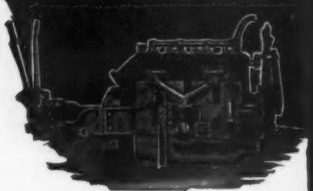
## The Kinsey Manufacturing Company, Toledo, Ohio

MANUFACTURERS OF AUTO PARTS

KINWOOD RADIATORS, FENDERS,  
KINWOOD OILERS, GASKETS,  
KINWOOD STEEL FRAMES,  
ETC., ETC.

SPECIAL METAL STAMPINGS

## Model Motors



Afford the utmost in reliability and power—with the least weight and fuel consumption. You can add much value to your car by using the Model Motor. We make them better and at less cost than you can, because we specialize in motors and power units. Write us for facts.

**Model Gas Engine Works**  
PERU, INDIANA



THE THOROUGHbred CAR

*Electric Self-cranking, Electrically Lighted  
Four Forward Speeds*

"Six Thirty-six" Touring Car and Roadster, \$1850  
Model 30 Touring Car..\$1350 Model 30 Roadster..\$1250

LIVE WIRE DEALERS  
WRITE FOR UNALLOTTED TERRITORY

**HERRESHOFF MOTOR COMPANY**  
Detroit, Michigan, U. S. A.

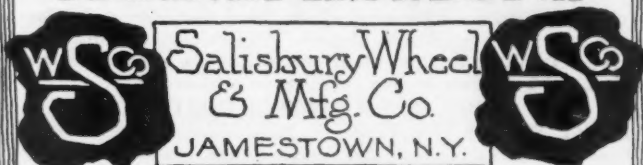
## Pullman 1914 ANNOUNCEMENT

Interesting to Dealers  
Will soon be made.  
Write for details.

PULLMAN MOTOR CAR CO.  
York, Pa.

## SALISBURY

AXLES WHEELS  
TRANSMISSIONS



## Safety First

Take no chances on Slippery Pavements and muddy roads.

*Equip all Four tires with*

## Weed Anti-Skid Chains

Universally used—Increasing demand—Easily handled—No dull season—No dead stocks.

*Sold by all Reputable Dealers*  
WEED CHAIN TIRE GRIP COMPANY, NEW YORK

**HYATT QUIET**

HYATT ROLLER BEARING CO. Works, Newark N. J. Detroit, Michigan.

## "VULCAN" SPRINGS

THE GOOD KIND



When next you are needing Automobile springs, we ask you to consider the Vulcan—a thoroughly good spring.

Stock on Hand to Fit:

Ford	Maxwell	Hudson
Overland	E. M. F.	Chalmers
Buick	Flanders	Oakland
Reo	Hupp	R. C. H.
Cadillac	Regal	Everett

**JENKINS MFG. COMPANY**  
118 N. Third St. ST. LOUIS, MO.



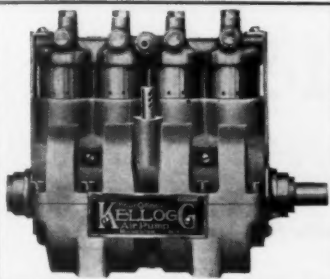
## "Twenty-Five" \$900

Long Stroke Motor, Big Roomy English Body, Center Control, Left Hand Drive, Every Necessary Accessory—And a Wonderful Economy Record

Five Passenger Touring Car, 110" wheelbase... \$ 900 f. o. b. Detroit  
Two Passenger Roadster, 110" wheelbase.... 900 f. o. b. Detroit  
Three Passenger Coupe, 110" wheelbase..... 1300 f. o. b. Detroit

### R-C-H CORPORATION

101 LYCASTE STREET, DETROIT, MICHIGAN



The pump which leading manufacturers have selected as standard equipment is the

**Four Cylinder  
KELLOGG  
Air Pump**

the pump you should have on your car because it inflates the largest tires to any desired pressure in half the time with least work on the motor.

Attachments for the Locomobile "L", "M" and "R" are now ready

Ask your dealer or write

KELLOGG MFG. CO 53 Circle St., Rochester, N. Y.

## THE ROBBINS SEDAN BODY

You have seen it—and admired it. Probably you did not know that it was a Robbins body. Probably you have wondered whose design and construction produced that handsome Sedan.

For your own comfort, you will need a Sedan body this winter.

LET US DESIGN IT

IRVIN ROBBINS & COMPANY

Address Sedan Dept.

10th and Canal, Indianapolis, Ind.

## Air Compressors

For Private and Public  
Garages

Single and Double  
Cylinders

Air and Water Cooled Types

Jacobson Machine

Mfg. Co., Warren, Pa.

HASTINGS & ANDERSON CO.  
Chicago, Ill.

Western Representatives



## HERCULES—"The Auto Lock That Lox"

The large amount of money invested in your car demands at least a small amount invested in its protection. \$7.00 is all a HERCULES costs—cheap insurance with no premium. The HERCULES is screwed into the gear shift lever with hardened screws and locked when this lever is in neutral. You cannot move your car except by hand even though you have a self-starter.

### GUARANTEED FOR LIFE

Neat and compact. Automatic in action and always attached. Fits nearly all cars using 3 or 4 speed selective type transmission.

Price, \$7.00

At all dealers or direct on receipt of price

State Agents Wanted  
Choice Territory Open

HERCULES LOCK COMPANY  
1816 E. 33rd Street, Cleveland, Ohio

Lock Attached



Automatically releases

## DURNO STARTER

Com -  
pressed  
Air -  
Kellogg  
Pump -  
No air in  
engine

cylinders - No distributor to wear - No check valves to carbonize. Starts Motor From Outside. Fits any car.



SPINS MOTOR

1914 BOOK

Durno Air Jack Lifts  
Largest Car Easily

No Heavy Battery—  
No wires—  
No expense to maintain

—Easy to install—Easy to understand—Saves time, money and disposition. Air for Tires. Two years' guarantee.

DURNO MANUFACTURING CO., Inc., 163 St. Paul St., Rochester, N. Y.



"32" Touring Car .....	\$1000
6-Passenger Touring Car.....	1200
"32" Roadster .....	1000
"32" Covered Delivery .....	1100
20 H. P. Runabout .....	750

All Models F. O. B. Detroit. Fully Equipped  
Literature sent upon request

HUPP MOTOR CAR COMPANY  
1228 Milwaukee Avenue Detroit, Mich.

# KEETON

DETROIT, U.S.A.

"SIX-48"  
\$3250  
Fully Equipped

Write for Booklet

Riverside Touring Car

Keeton Motors Ltd.  
Brantford Ont.  
Canada.

Keeton Motor Co.  
Lawton & M.C.R.R.  
PHONE WAL 1067 Detroit U.S.A.



## WARD-LEONARD SYSTEM

WARD LEONARD



Lighting - Starting

### Faultless Lighting Infallible Starting

WARD LEONARD ELECTRIC CO.  
BRONXVILLE N. Y.

## JESCO ELECTRIC STARTING & LIGHTING

TRADE MARK  
ASSURES 100% EFFICIENCY



JONES ELECTRIC STARTER CO.  
ADAMS & LOOMIS ST'S. CHICAGO, ILL.

Resists Oils, Heat, Dirt  
and Water

The  
Insulation  
Lasts

# Packard

CABLE

Saves  
Cost of  
Rewiring

Write for samples  
and prices

**The Packard Electric Co.**  
Warren, Ohio (40)

## Argo Electrics

have established the standard of electric  
car construction for all time to come.

*Write for Dealer's Proposition*

"Creating for the Future—  
Not Rebuilding from the Past."

**METZGER-HERRINGTON ARGO COMPANY**  
Distributors  
2412 Michigan Avenue, Chicago  
FACTORIES: SAGINAW, MICHIGAN

# Red Head

REG. U.S. PAT. OFFICE

## MAGNETO PLUG



All Sizes  
All Styles  
Porcelain  
or Mica \$1.00

EMIL GROSSMAN COMPANY  
Manufacturer  
250 WEST 54th ST.  
NEW YORK  
Detroit Branch and Factory  
844 Woodward Avenue

## FINISHED CRANK SHAFTS COMPLETE CONNECTING RODS COLD DRAWN STEEL SHAFTING

Screw Stock, Flats, Squares,  
Hexagons and Special Shapes

FINISHED MACHINE KEYS - MACHINE RACK

All material finished to a  
superior degree of accuracy

**STANDARD GAUGE STEEL CO.**  
BEAVER FALLS, PA.

Crank shaft is of large diameter—self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. Their extra large bearings reduce friction to a minimum—increases durability and efficiency.

## Wisconsin

CONSISTENT

### Motors

ALL 4 CYCLE—5 TYPES

3 1/2-inch bore.....	5-inch stroke.....	4-cylinder
4 1/2-inch bore.....	5-inch stroke.....	4-cylinder
4 1/2-inch bore.....	5-inch stroke.....	6-cylinder
4 1/2-inch bore.....	5 1/2-inch stroke.....	4-cylinder
5 1/2-inch bore.....	7-inch stroke.....	4-cylinder



**WISCONSIN MOTOR MANUFACTURING COMPANY**  
Dept. 25, Milwaukee

# FEDERAL TIRES

give "Extra Service"

**Federal Rubber Mfg. Co. Milwaukee**

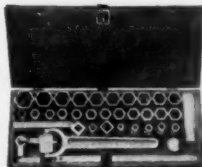
The Best Set Is Cheapest at Any Price.  
That Set Is the

## Bay State Autokit

REFINED IN EVERY DETAIL.

Two Sizes  
\$10 \$7.50

Costs no more than inferior sets, but it satisfies twice as well.



Will reach any nut or bolt on any car, and turn it either way.

Ask your dealer or write us.

GEO. A. CUTTER, SALES AGENT Taunton, Mass.

## Warner Auto-Meter

MAGNETIC PRINCIPLE

95% of all the speedometers to be made during 1913 will be built on the magnetic principle.

Warner Auto-Meter Factory, Beloit, Wis.  
Address Dept. 1

Branches in all principal cities  
all over the world

# Settled

## The Cleaning Question

Old Dutch Cleanser routs out dirt in a jiffy—quickly removes rust—cuts cleaning costs, time and labor as well as grease and grime. "Settled" the cleaning question.

Fine for cleaning steel, copper, brass, iron and nickel plated metals, floors and floor coverings, lavatories and wash bowls, painted walls and wood work. Contains no caustic or acids.

Buy and try a can or two.

Many Uses and Full Directions on Large Sifter-Can—10c

## O. B. PORTABLE AIR COMPRESSOR

(Patents pending in all leading countries.)

No other air compressor is comparable with the O. B., considering its size, weight, price and portability. Needs no wiring or piping. Instantly available. Delivers an abundance of absolutely pure air, free from traces of oil or moisture, shocks or impulses. Two cents' worth of gasoline will inflate 50 tires—will inflate an average size tire to full pressure in 18 seconds.



No garage complete without one. Let us tell you more about this wonderful air compressor, and of our other types.

Write for prices

UNIVERSAL MFG. CO.

Successors to Oscar M. Bergstrom  
308-310-312 Ninth St., So.  
MINNEAPOLIS, MINN.

## Detroit Demountable Rims



### "Positive"

Absolutely self-centering, and held so by V-blocks on felloe band and on rim.

DETROIT DEMOUNTABLE RIM CO.  
247 Jefferson Avenue DETROIT, MICH.

## PENNSYLVANIA Oilproof VACUUM CUP TIRES

Making Their Mark  
Everywhere

Pennsylvania Rubber  
Company

Jeanette

Pa.

An independent company with  
an independent selling policy



## Kingston IGNITION DEVICES

High and low tension magnetos, make-and-break coils, dash coils, box coils, motorcycle coils, switches, spark plugs and other ignition specialties. Guaranteed satisfaction.

WRITE FOR CATALOG

KOKOMO ELECTRIC COMPANY, Kokomo, Ind.

## American Axles

Found only  
on high  
grade cars

THE AMERICAN BALL-BEARING CO.,  
Cleveland, Ohio



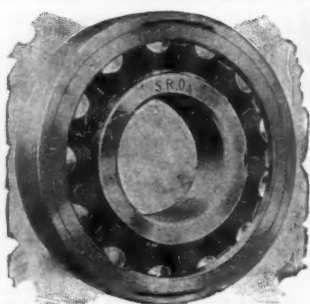
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TRADE MARK

**TUTO 2-TONE HORN** Electrically transmits two different and distinct sounds; the degree of sound being regulated by the pressure of the thumb upon one button located on the steering wheel. One tone gives polite notice, the other says "Danger!" in unmistakable terms. Complete with button and cord, \$25.00. Elyria-Dean products manufactured only by

**THE DEAN ELECTRIC COMPANY**  
504 OLIVE STREET ELYRIA, OHIO, U. S. A.

"Look for Elyria-Dean where Quality's seen."



**S. R. O.**  
Oldest and Leading European  
Ball Bearing

*Mea Magneto*

Write for Particulars  
and List of Users

**MARBURG BROTHERS, Inc.**

Sole Importers

Detroit 1790 Broadway, New York Chicago

## INTERLOCKS

Double Your Mileage

**INTERLOCKS** make new tires wear twice as long, or give you an extra season's wear out of old tires.

More than that, **Interlocks** give you confidence that you will not have blow-outs, rim cuts or punctures to spoil your motoring pleasures.

**Interlocks** are complete inner tires—not inner shoes—placed between the outer casing and inner tube to strengthen the casing and protect the tube from punctures. They insure safety—make new tires give twice the usual mileage, and add 1000 to 5000 miles to old ones. Don't affect resiliency.

**Car owners and dealers**—write for our booklet giving facts about road tests, prices, testimonials, and our 1913 proposition.

**DOUBLE FABRIC TIRE CO., 128 W. 9th St., Auburn, Ind.**

**GET Acquainted WITH EAGLEINE NO-KARBON OIL**

EAGLEINE NO-KARBON OIL possesses less than one-half the carbon and other impurities contained in all other cylinder oils. It's a lubricating wonder. Its use means a clean motor.

**EAGLE OIL & SUPPLY CO.**  
104 BROAD ST., BOSTON.  
114 W 37th ST., CHICAGO, ILL.



## FORD OWNERS

### The 'BLITZ' Ignition System

Stops all of your ignition troubles. Makes your car more efficient. Uses Ford magneto current. Eliminates the back kick.

**Price \$20.00**

**Electrical Specialties  
Mfg. Co.**

**Omaha, Neb.**

## KRUPP STEEL

IS NO EXPERIMENT. It is the best that brains and years of experience can produce. Manufactured in various grades for all motor car parts. Round forged bars of chrome nickel steel, grade E F 60.0, carried in stock in New York City.

**THOMAS PROSSER & SON**

28 Platt Street, New York City

## UNIVERSAL JOINTS

"SPICER" MEANS QUALITY

"SPICER" on universal joints means quality, and "SPICER" quality has been a standard ever since universal joints have been manufactured.

Let us quote you prices on your requirements

**SPICER MFG. CO., Plainfield, N. J.**

**Domestic Representatives:** K. Franklin Peterson, 122 So. Michigan Blvd., Chicago. Thos. J. Wetzel, 17 West 42nd St., New York. L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit. **Foreign Representative:** Benjamin Whitaker, 21 State St., New York.



## BLACK EAGLE Spark Plug

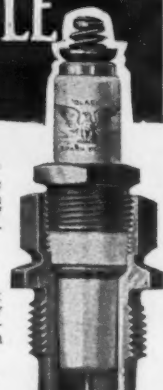
**50c. IS ENOUGH**

The "Black Eagle" Spark Plug marks the dawn of a new era. From now on The Price of Spark Plugs will gravitate to Fifty Cents.

**Why not be a pioneer in your territory?**

The reason is apparent—none better at any price. Made in all standard threads milled upon receipt of price.

**THE STANDARD CO.**  
Torrington, Conn.





## Automobile Electric Lighting

Guide Book No. 6 gives sizes, prices, details of construction, lists of material required for complete installation, together with other information relative to automobile lighting in general.

Write for it today.

THE GUIDE MOTOR LAMP MFG. CO.  
CLEVELAND, OHIO

(28)



### Every Stutz Car

is exceedingly easy-riding and comfortable. The straight line low slung body, deep upholstery and luxurious appointments of the Sturdy STUTZ give it that aristocratic design which lends dignity and quality to a high class motor car.

Write today for advance booklet A-2 Sturdy STUTZ Announcement. Series B.

STUTZ MOTOR CAR COMPANY  
Manufacturers of Stutz Cars Indianapolis, Indiana

## WESTON MOTT & CO

FLINT, MICH.

## AXLES, HUBS, RIMS

Strength and durability are factors of utmost importance, and all our products are made to meet the severest tests.

## Detroit Mechanical Starter For Ford Model T Cars

Enables you to crank your engine from the seat. It operates mechanically—no electricity, no gas, no air.

It is perfect in construction; simple and easy to operate.

No danger from back-firing. No possible harm to the motor.

The Detroit Mechanical Starter is easily attached, light in weight, positive in operation.

It is guaranteed free from mechanical defects for sixty days and is low priced. Write us for further information.

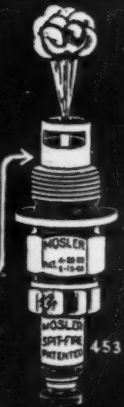
DETROIT MECHANICAL STARTER COMPANY  
1191 Woodward Avenue Detroit, Michigan

## Mosler Spit Fire Plugs are the BEST

FOR 13 YEARS HAVE BEEN LIKE THIS

INSIST ON OUR  
GENUINE PLATINUM POINTED PLUGS

A. R. MOSLER & CO.,  
P. O. BOX "M", MT. VERNON, N.Y.



1893  
**HAYNES**  
1913

*America's First Car—*

*after twenty years of continuous successful manufacturing*

*—Still It's Foremost*

Wide Line of Models

HAYNES AUTOMOBILE CO.,

Kokomo, Ind.

## STAPLEY

TIRE PUMP

**Always Ready  
Always Works**

The STAPLEY is a compound pump. Has seamless brass tube cylinders, non-leakable joints, automatic valve and heavy cast base. A Guaranteed tire pressure gauge if you want it.

Price without gauge  
\$4.00

With gauge  
\$6.00

BRIDGEPORT BRASS COMPANY  
P. O. Station A. Bridgeport, Conn.



"THE TUGBOAT OF LAND COMMERCE"

SOLVES THE  
HEAVY TRUCKING  
PROBLEM

**Knox**

MARTIN  
TRACTOR



SEND FOR CATALOGUE

**KNOX AUTO CO.,**

SPRINGFIELD  
MASS.



## MOTOR TRUCKS

### THREE EXCEPTIONAL MODELS:

Model ED—1,000 lbs. capacity (2 cyl.).....\$ 750  
 Model B—1,000 to 2,000 lbs. capacity (4 cyl.).....1,100  
 Model C—2,000 to 3,000 lbs. capacity (4 cyl.).....1,775

Write us for full information and liberal specifications.

THE DART MOTOR MANUFACTURING CO.  
 WATERLOO, IOWA (18)

Great Western

FORTY  
 1913 FULLY \$1585  
 EQUIPPED

LUXURY — POWER  
 ABSOLUTE SILENCE

WRITE FOR OUR NEW CATALOGUE  
 GREAT WESTERN AUTOMOBILE CO.  
 DEPT. 20 PERU, IND.

## THE RUTENBER MOTOR

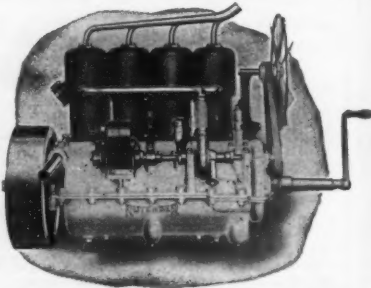
MANUFACTURED SINCE 1901 FOR HIGH GRADE  
**AUTOMOBILES and TRUCKS**

8 1/2 x 5 1/2 four and six cyl-  
 inder.  
 4 1/2 x 5 1/2 four and six cyl-  
 inder.

Standard or Unit  
 and  
 4 x 4, 4 1/2 x 5 and 4 1/2 x 5  
 Standard Types. All L  
 Head 4 Cycle.

Manufacturers are invited  
 to investigate our service  
 and our facilities. Litera-  
 ture on request.

**The Rutenber  
 Motor Company**  
 Marion, Indiana



## THE MAYER CARBURETOR

Gives the motor the right mixture at varying speeds, is the most economical, reducing gasoline expense a full 25 percent. And with the MAYER you can get from 15 to 30 percent more power from your motor than with 90 percent of the other carburetors on the market.

Write for catalogue No. 26E and learn the merits of the MAYER

**MAYER CARBURETOR COMPANY**  
 2673 Main Street, Buffalo, N. Y.

## HESS AXLES

HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

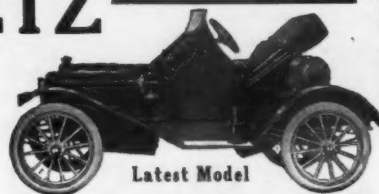
Renewals of HESS contracts for 1913 from past users and an increasing HESS demand among new manufacturers, is ample proof of the stability of HESS Quality.

May we be of service to you? Write us.

**THE HESS SPRING & AXLE COMPANY**  
 CARTHAGE, OHIO, U. S. A.

## METZ "Twenty-Two" Roadster \$495

COMPLETELY  
 EQUIPPED



Latest Model

Center control, left-hand drive, 4-cylinder 22 1/2 H. P. water-cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, wind shield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gallon of gasoline, climbs hills as fast as ANY stock car made. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

**METZ COMPANY, Waltham, Mass., U.S.A.**



### For Ball and Roller Bearings

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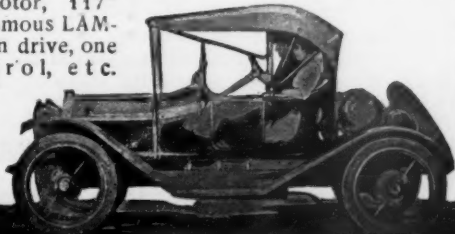
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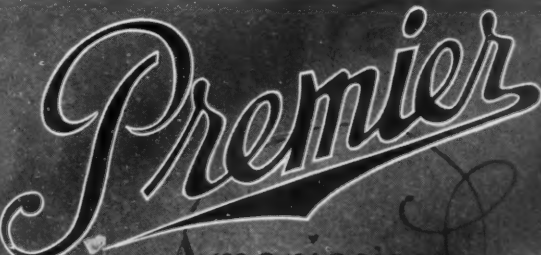
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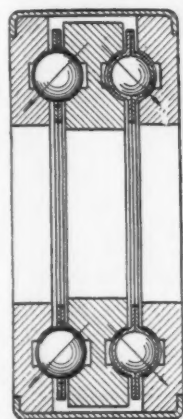
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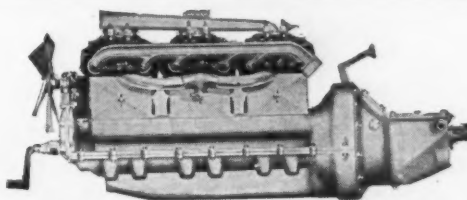
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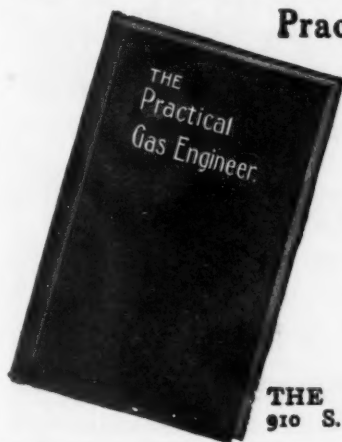
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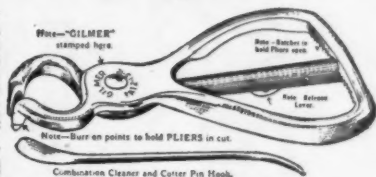
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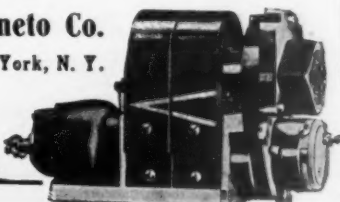
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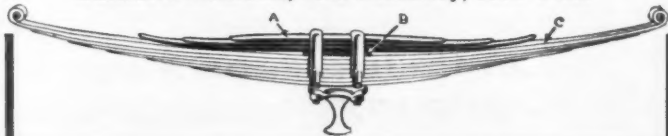
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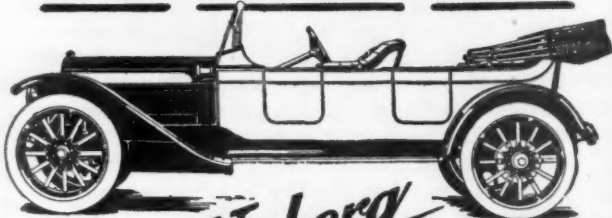
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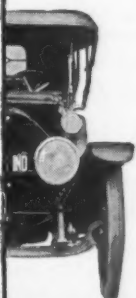
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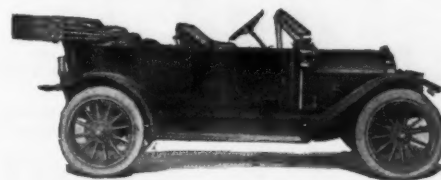


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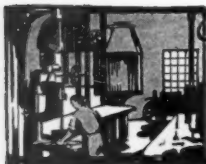
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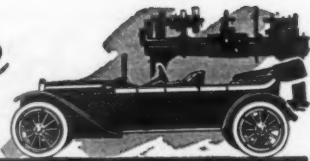




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453 Trombly Avenue Detroit, Mich.

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You can perhaps realize on your insurance policy—if you have one—if your car is stolen, but what of the 60 days waiting for proof, etc., and you without a car?

If your car is equipped with a

## COMBINATION IGNITION LOCK

you are absolutely insured against theft. Inexpensive; applied to any car; simple; no keys; works like the dial of a safe. Ask for details and catalog.

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1467 Michigan Avenue CHICAGO

## Annular Ball Bearings REGROUND

We carry a complete stock of re-ground bearings of all makes and sizes, for immediate exchange.

Get Our Prices

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## TIRES—TIRES

All New 1913 Stock  
Direct from leading tire manufacturers

Size.	Casing.	Tubing.	Reliners.
28x3	\$ 7.50	\$1.90	\$1.80
30x3	7.65	1.95	1.90
32x3	7.80	2.05	1.95
34x3	11.00	2.70	2.60
36x3	12.00	2.90	2.85
38x4	15.70	3.60	2.80
36x4	14.00	3.70	2.85
34x4	17.25	3.80	2.90
32x4	17.50	3.90	2.95

C. O. D. orders sent same day as received upon receipt of 10 per cent, subject to your examination.

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and development of new ideas will receive our prompt attention. We have an entirely new equipment of turret lathes, broaching machines, worm and worm gear machines, lathes and other necessary tools, so that large contracts can be handled to advantage by us. Send blueprints or samples of articles you want manufactured, and we will give you figures on such articles, ready to ship.

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1204 18th Street  
RACINE, WISCONSIN

### Peerless Auto Top Dressing

Waterproofs leaking mohair, duck and canvas. Makes old tops look like new.

1 gal.	\$3.75	1/2 gal.	\$1.98
1/2 gal.	\$1.85	1/4 gal.	\$1.04

### Peerless Leather Top Dressing

A preserver for all rubber, leather and pantosote. Does not stiffen or harden the top.

1 gal.	\$3.50	1/2 gal.	\$ .98
1/2 gal.	\$1.85	1/4 gal.	\$ .51

### Peerless Lining Dye

For dyeing linings of all tops and curtains a black, uniform color.

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Renews and softens leather seats and cushions. Will not crack, chip or peel, wash or rub off.

1 gal.	\$3.50	1/2 gal.	\$ .98
1/2 gal.	\$1.85	1/4 gal.	\$ .51

### Peerless Extra Fine Black Japan

Air drying with a high gloss finish on lamps, radiators and fenders. Will not crack, chip or peel.

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Heavy bodied, air drying. No primer or undercoat required.

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For brass, nickel or iron. Bakes to a high gloss, egg shell gloss or dull finish that will not crack, chip or peel.

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COLUMBUS, OHIO

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(4) 16"x6'	
(4) 14"x6'	
(2) 12"x6'	

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10"-12"-20"-22"-26" Back Geared  
All makes

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No. 4 Brown & Sharpe Plain

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32" Bullard Vertical with turret head  
Fitchburg Horiz. with 3" bar

### SHAPERS

20" Steptoe 24" Hendey  
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7/8" to 2" capacity, plain and back geared

ALL MACHINES GUARANTEED  
HEADQUARTERS FOR BARGAINS

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E-M-F 30 Dashes, \$1.  
E-M-F 30 1910 Frames, \$10.  
E-M-F 30 Rear Springs, \$2.50.  
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Flanders 20, 4-passenger Tops, \$8.  
Buick 10 Surrey Tops, \$9.  
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Spark Plugs, 33c.

**Autoparts Manufacturing Co.,**  
453 Trombly Avenue, Detroit, Mich.

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Equip your power boat with a modern superior motor—3-cyl. valveless, 2-cycle, 15 H. P., 5 1/2 in. bore, 5-in. stroke, complete with oiler. Can be used on boats, as stationary engines, or for any purpose suited to gas engines.

#### Other Guaranteed New Motor Bargains

Reg. Price	Our Price
Reliance—H. P. 20, 4-cyl., 4 cycle	\$500 \$125
Chester—H. P. 30, 4-cyl., 4 cycle	\$500 \$175
Poss—H. P. 24, 4-cyl., 4 cycle	\$400 \$140
Beaver, 4 1/2 by 5 1/2, 4-cyl., 4 cycle	\$550 \$175
Hershell-Spellman—H. P. 60, 6-cyl., 4 cycle	\$600 \$275
Welsh—H. P. 90, 4-cyl., 4 cycle	\$600 \$300
Maxwell—H. P. 25, Model Q, unit power plant	\$500 \$175
Buda—4 1/2 by 5, H. P., block type, L head, 4 cyl.	\$450 \$200

#### MAGNETOS

Reg. Price	Our Price
Bosch D. 6-cylinder	\$150.00 \$45.00
Bosch D. R.	\$150.00 \$45.00
Bosch D. 4	\$125.00 \$30.00
Remy	\$80.00 \$25.00
Kurtz, Dual	\$80.00 \$25.00
Splitdorf	\$80.00 \$17.50
Splitdorf, 2-cylinder	\$60.00 \$15.00
J. & B., 1 cylinder	\$50.00 \$15.00

#### WINDSHIELDS

Reg. Price	Our Price
\$20.00 \$25.00 \$30.00 \$35.00 \$40.00	
Our Prices	5.00 8.00 9.50 12.50 17.50
"Zigzags,"	\$12.50

#### HORNS

Electric, High-grade, vibrating. Best quality Complete with wire and push button.

Reg. Price	Our Price
Large size	\$18.00 \$4.75
Small size	15.00 3.75
Bulb—Large size, solid brass, any length tubing	6.50 1.75
Exhaust	8.00 3.00

#### TANKS

Reg. Price	Our Price
Gasoline, Oval, 18 in. high, 12 in. wide, 30 in. long	\$25.00 \$6.00
Oblong	20.00 4.00
Round, 33 in. long, 15-in. diam.	20.00 6.00
Prest-O-Lite, B size	25.00 13.50
Oil, Best quality lubricating in barrel lots, per gallon	.50 .28

#### LAMPS

Reg. Price	Our Price
Head—Large 12-in., best quality reflectors, per pair	\$25.00 \$12.00
Head—3 1/2-in. best quality reflectors, per pair	20.00 7.00

#### CARBURETERS

Reg. Price	Our Price
Kingston—Each	\$20.00 \$2.50
Flanders—1-in. only, each	10.00 1.50

#### SPARK PLUGS

Reg. Price	Our Price
\$1.00 each	35c each

#### SELF-STARTERS

Reg. Price	Our Price
Blitzen—Complete. All attachments	\$25.00 \$5.00
Electric Light Outfits, for lighting acetylene gas lamps and reflectors	20.00 2.50
Special—This week only—Caloris Hot and Cold Water Bottles, Aluminum Covers—Reg.	\$5.50
Our price	\$1.95

#### COILS

Reg. Price	Our Price
Vibrating, 4-cylinder	\$40.00 \$12.00
Vibrating, 6-cylinder; can be used any number of cylinders; each unit separate	60.00 15.00

Parts It is impossible to quote all prices, as all these goods are sold for ABOUT 15c TO 20c ON THE DOLLAR of the actual cost of manufacture. Special prices sent on request.

Our Price	
Wheels (assorted sizes)	\$3.00 up
Axles (assorted sizes)	7.50 up
Steering Column (complete with wheels), spark and gas control	15.00 up

Our Price	
Rear Axles (assorted sizes)	\$30.00 up
Transmissions	40.00 up
Ball Bearings (all makes, sizes, kinds)	.50 up

Shock Absorbers—Latest type double spring. Built on same principle as the J. M. Because of agreement with manufacturers we cannot advertise the name. Per pair

Reg. Price	Our Price
Foster Shock Absorber—Complete set	25.00 6.00
Bumpers—Brass, black and nickel finish; fit all makes of cars	15.00 6.00

#### SPEEDOMETERS

Reg. Price	Our Price
Standard, complete, all attachments; shows 60-mile hour speed trip and protected in strong case	\$25.00 \$ 6.50
Other makes, up from	5.00
Auto Clocks, 8-day well finished and protected in strong case	8.00 4.50

#### STEERING WHEELS

Reg. Price	Our Price
16-in. Aluminum Spider, best quality	\$ 8.00 \$ 2.50
18-in. Aluminum Spider, latest type	10.00 4.00
Steering Posts, 16-inch wheel, Gas and Spark control, complete	100.00 15.00

#### NEW CAR BARGAINS

##### At Half Price

New	1912 REGALS	New
Reg. price, 40 H. P., 7-pass., \$1,750		\$885
Our price		\$885
Reg. price, 30 H. P., 5-pass., also 4 pass., \$1,250		\$700
Our price		\$700
Reg. price, 40 H. P., 5-pass., \$1,700		\$835
Our Price		\$835

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Regals Overslung are unquestionably the highest quality Touring Car on the market. If you are in the market for a high-class, snappy car, now is your chance to get real value.  
Supply Is Limited Cars Selling Fast  
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The best enclosed Electric in the world—mileage from 80 to 100 miles on one charge  
Speed, 20 miles per hour  
COME AND SEE WHAT WE HAVE TO OFFER  
Regular Price.....\$2,850  
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##### SAMPSON TRUCKS

##### ABOUT HALF PRICE

Reg. Price	Our Price
Sampson 1 1/2 Ton Truck	\$2,000 \$1,300
Sampson 3 Ton Truck	3,400 1,950
Sampson 4 Ton Truck	4,250 2,250
Sampson 5 Ton Truck	4,750 2,600

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Reg. price, \$40. Can be attached to any motor. Price \$7.50 in a few minutes to any motor.

New Cars Consist of the surplus stocks bought for spot cash from a number of leading makers, the names of whom, by agreement, we cannot publicly advertise by reason of these cut prices. They will be given, together with full particulars, to any one inquiring by letter or in person.

We have now on our sales floors:

Reg. Price	Our Price
25 H. P. Runabouts, new, 1912..	\$ 780 \$495
30 H. P. Runabouts, new, 1912..	1,375 875
35 H. P. Runabouts, new, 1913..	1,575 875

Bodies Our Body Department contains the largest assortment of two and fore-door bodies in America. Every size and style of 2, 4, 5, 6 and 7-passenger, open and closed. Wide, roomy, well-finished, high grade.

#### SPECIAL

5-Pass. Foredoor Body, all sizes, to fit any car, upholstered in best quality leather, painted, ready for mounting

Reg. Price	Our Price
\$300	\$85

Reg. Price	Our Price
Runabout Foredoor	\$250 \$75
Runabout Roadster	\$200 \$60
Touring Toy Tonneau	\$300 \$85

Reg. Price	Our Price
Limousine	\$650 \$350

Coupe, inside drive, 2, 3, 4  
5-pass. body \$800 to \$1,500 \$250 to \$400  
Top complete, fitted to body with side curtains, extra \$25

#### GUARANTEED INNER TUBES

Regular Price	Dealer's Price
Gray Red Gray Red	
28x3	\$3.05 \$3.50 \$2.25 \$2.50
30x3	3.20 3.65 2.40 2.70
30x3 1/2	4.30 4.90 3.35 3.50
32x3 1/2	4.50 5.15 3.45 3.60
32x4	5.90 6.70 4.25 4.45
34x3 1/2	4.85 5.50 3.60 3.85
34x4	6.20 7.05 4.50 4.70
36x4	6.60 7.50 4.60 4.80

Send for Complete List

Tires We are the largest jobbers in Tubes and Tires. Guaranteed Standard Makes at Cut Prices. Always carry a large stock, all styles of "factory seconds" and shop soiled tires. Do not be deceived and pay for a guarantee that means nothing but trouble.

All Fresh Goods—Complete prices furnished on request. Following are a few special bargains:

Reg. Price	Our Price	Reg. Price	Our Price
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30x3	13.50 8.25	32x4	29.25 16.50
30x3 1/2	19.25 10.00	34x4	31.80 17.50
32x3 1/2	21.10 12.50		

Other sizes in proportion.  
Reg. Price Our Price

Blow-out Patches—Rubber, rawhide and chrome leather. All sizes. Each \$1.50 40c

Solid rubber tires, all sizes, at greatly reduced prices. Send for special tire list.

Tops always in stock. The largest and most complete line of high-grade mohair and pantasote tops of the best quality material.  
Reg. Price Our Price

Reg. Price	Our Price
5-Pass. Touring Top, complete	\$75.00 \$25.00
4-Pass. Touring Top, complete	60.00 18.00

Reg. Price	Our Price
Runabouts, all sizes, complete	50.00 15.00
Top Covers, all sizes	10.00 2.50
Cushions—All sizes	15.00 \$3.00 up
Rumble Seats—Each	15.00 7.50 up

#### 50% From the REGULAR PRICE

Reg. Price	Our Price
Tire Holders (Japanned Finish)	\$3.50 \$.85
Foot Pumps	3.50 1.25
Radiators—Our price about 80c on the dollar. Prices quoted on receipt of style desired.	

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Remember, all accessories purchased from us can be returned intact within a week and money will be refunded.

Advise us of your needs and we send special quotations.

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New Goods Made to Order  
Ford T.....\$18.00 Buick 10.....\$22.00  
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And All Other Makes at Equally Reduced Prices



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your car will make you the envy of the town. Everybody who has one is more than pleased. Looks so good to car owners that anybody can make money selling them. Installed in 5 minutes, with wrench only. Blown on a new principle, giving it the power of a locomotive whistle. Our agencies are valuable. Write for circular and cut. Buell Auto Company, 6051 Cottage Grove Ave., Chicago.

**New Auto Bodies**

Delivery bodies, all styles, panel top, also open express, \$25 to \$40. 2, 4 and 5, Passenger Foredoor bodies, \$60 to \$80.

MOTORS—2, 4 and 6 Cylinder Motors, and Unit Power Plants. Axles, Frames. Auto parts and equipment of all kinds.

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Mechanically attached, without springs or clamps. Gives quick, reliable and everlasting service. Price 35c each.

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15"x 8' Bradford Lathes.

20"x10' Springfield triple-gear lathes.

24"x 8' Lodge Shepley quick change gear lathes.

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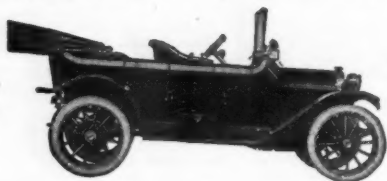
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Long  
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Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

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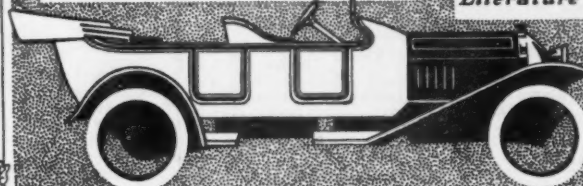
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1910 Phaeton overhauled this Spring; tires in fine shape; car fully equipped, including Klaxon Horn; Warner Speedometer and clock; seat covers; tire rack and tube case. Address, Box D 385, c/o Motor Age. k

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**A 7 PASSENGER, 40 HORSE POWER** White Steamer and one 20 h. p. 4 pass. Both machines like new. Joy valve engines, kerosene burners, operating for one-half cent per mile. Address Box D 151, c/o Motor Age. w

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1912 Abbott Detroit Battleship Roadster, perfect condition, original price \$2250.00, will take for quick sale \$1600.00. Address Box D 373, c/o Motor Age. s

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**FOR SALE—BRAND NEW 1913 5-PASSENGER** Krit car, \$850; closing out stock. H. M. Whitcomb, Albany, Wis.

**FOR SALE — COLUMBUS ELECTRIC** Coupe; run 5,000 miles. Also Westinghouse automatic rectifier. Address T. M. Beatty, Quincy, Ill.

**FOR SALE—LIBERTY BRUSH, GOOD** condition, with top and new tires. New Boston Garage, New Boston, Tex.

**FOR SALE—LOCOMOBILE, 1910 MODEL L,** equipped with top, Mica wind shield, Klaxon horn, toy tonneau body. Car in elegant condition. This is a beautiful little car and a snap for somebody for \$1,150. Address Box D 400, c/o Motor Age. d

**FOR SALE—ONE 1913, SEVEN-PASSENGER** Big Six Lozier, used as demonstrator, run less than 5,000 miles; factory overhauled and repainted; looks as good as new; two spare tires, four spare rims; for \$4,000. One 1912 4-44 Pullman; run less than 500 miles; factory overhauled, new top, repainted, electric lights, self starter, spare tire; \$1,500.

One 1911 Firestone Columbus in excellent shape, five-passenger; \$800. All cars f. o. b. Louisville.

Louisville Lozier Company,  
405 West Broadway, Louisville, Ky.

**FOR SALE—WHITE STEAM CARS; VARIOUS** models, in excellent condition; also parts for steamer engines and generators. We specialize in steamers. Joseph Libal, 3145-53 N. Halsted St., Chicago. k

**FOR SALE—PACKARD "30" 1912; FULLY** equipped, perfect condition. Cost \$1,700, price \$2,500. Fisher Automobile Company, Indianapolis, Ind.

**FOR SALE—25 H. P. DETROITER; CAR** fully equipped. First class condition. 1912 model. A bargain. Good reason for selling. R. F. DuComb, 513 E. South St., South Bend, Ind.

**FORD T TOURING CAR, COMPLETE,** fine shape. \$325. Automobile Supply Co., Burlington, Wis.

**FRAME, WHEELS, SPRINGS, BOTH** axles and transmission from National car. Like new; \$100. F. E. Alford, Goshen, Ind.

**G. J. G. —SPECIAL RACING MACHINE** capable of doing better than 70 miles per hour mounted on English style of wire wheels with Bosch racing magneto and motor modeled so as to have the minimum of friction to the maximum of speed. Equipped with New any make selected of standard tire equipment. Write for Photograph and specifications to G. J. G. Motor Car Company, White Plains, N. Y.



### A Good Reason

"We do not care to repeat the advertisement in reference to the Knight car at this time. We sold it through the MOTOR AGE advertisement. That's why."  
H. H. W.

#### MITCHELLS REBUILT, GUARANTEED.

These cars are fully equipped. Call or write for further particulars. Mitchell Automobile Co., 2334-36-38 Michigan Ave., Chicago.

**ONE 16 and ONE 20-PASS. AUTO BUSES.** Have been run only a short time. At a bargain. Beck & Son, Cedar Rapids, Iowa.

**OVERHAULED IN A ONE CONDITION 4** cyl. 1909 Rambler 30 H. P. 5 pass. New tires cheap. \$450.00 or will trade in on new light car 5 pass. Address, J. A. A., 2904 W. 3rd St., Duluth, Minn.

**PIERCE-ARROW "38" 1910, 5-PASS., 6 CYL.,** \$1550; Thomas "48," 1911, 7-pass (fore-door), 6 cyl., \$1,600; Fiat (chain drive) "60," 1910, 7-pass., 6 cyl., \$1,200; Houghton-Rochwell "60," 1912, 5-pass. (fore-door), 4 cyl., \$1,850. Fully equipped; in excellent mechanical, tire and paint condition. Lloyd Motor Co., 315 W. Main St., Richmond, Virginia.

**THREE NEW R-C-H CARS, \$765.00 F. O. B.** Detroit. On account change in management, we have been obliged to cancel our order for these cars for our salesmen. They have not as yet been shipped from the factory. American-Lithuanian Knitting Co., Kenosha, Wis. k

**THOMAS FLYER RUNABOUT 4-60—IN** excellent condition. Must sell to settle estate. Will sacrifice if taken immediately. E. R. M., 11 No. Harrison St., East Orange, N. J.

**THOMAS FLYER RUNABOUT 4-60—WILL** sacrifice for cash. Buying touring car. H. C. Levin, 2160 Broadway, New York.

**10 TAXICABS, IN RUNNING CONDITION,** at \$300 each. Splendid opportunity for someone wishing to start in this money-making business, requiring but a small investment. The White Co., 2635 Wabash Ave., Chicago, Ill.

**1913 CHALMERS 36 TORPEDO — COM-** pletely equipped, Klaxon horn and extra tire. Run 3,500 miles. \$1,350 cash. 1206 Myrtle St., Franklin, Pa. h

### Parts and Accessories FOR SALE

**APPLY BOYER'S AUTOMOBILE RE-FIN-** isher to your car and it will look like new. One application lasts a year. "The Wonder of the Automobile World." For Dull Hoods, Fenders and Bodies. Particulars Free. Boyer Chemical Laboratory Co., 2 East Michigan Street, Chicago.

#### ATTENTION—HENRY OWNERS

Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars. Muskegon Automobile Co., Muskegon, Mich.

**AUT-O-LITE STORAGE BATTERIES, 6-80;** all makes, new and used; \$2.50 to \$9; guaranteed; get bulletin. 4105-7 Cottage Grove Ave., Chicago. a

#### AUTOMOBILE OWNERS

Stop paying high prices for your accessories and supplies.

Tell me your needs and I will "show you."

B. JAY BARRIER,  
First National Bank Building,  
Cincinnati, Ohio.

#### AUTOMOBILE BODIES, PLEASURE AND Commercial.

Foredoors for open-front cars. Write for prices. Auto Specialty Mfg. Co., 326 E. Market St. Indianapolis, Ind.

#### AUTO OWNERS IN SMALL TOWNS.

You can save one-half your tire expense and nearly all your tire trouble by using Security Reliners. Many of our customers run their cars the entire season without blowout or puncture and without spending a cent for tire repairs.

#### YOU CAN DO IT YOURSELF.

If we have no dealer in your town you can get a trial order at the dealer's price, and make a good profit selling to your neighbors. If you run your own car write at once for our plan.

SECURITY RELINER CO.,  
301 Spring St., Montgomery, N. Y.  
248 W. 54th St., New York.

**A WHITE STEAMER GENERATOR AND** burner, almost new. Will sell cheap. Address Box D 245, c/o Motor Age.



**AUTO WHEELS, DEMOUNTABLE AND Q.**  
D. rims. The latest and best truck tires. All styles applied on short notice; axles, springs, frames and bearings repaired. Meeker Manufacturing Co., Bell East 383. Home 3105. Dayton, Ohio.

#### BARGAINS.

Self Starters, Disco, 4 cyl., \$5.00; Kingston Carburetors, new 1 1/4", vertical intake, \$3.00; Steering Gears, Warner, complete, 18" wheel, \$12.00. Automobile Appliance Co., 1712 Michigan Ave., Chicago, Ill.

#### BERGDOLL REPAIR PARTS

The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.

Louis J. Bergdoll Motor Co.,  
124 N. 3rd St., Philadelphia, Pa.

**BRAND NEW 35-40 H. P. FOUR CYLINDER** motors, with fan, pump, clutch, magnet and coil. Price \$222.50. Not old, discontinued models, but up-to-date in every way. F. E. Alford, Goshen, Ind.

**COIL PARTS—PLATINUM POINTS, CONTACT** springs and screws for all makes of coils and magnetos. Largest house in United States for these parts. Write for catalog and price list. The Erie Supply Co., 242-244 Erie St., Toledo, Ohio, U. S. A.

#### CUT-OUTS

E.M.F., Flanders, Buick, Regal, etc. Complete outfit with brass lock, open pedal, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

#### DETROIT FORE-DOORS

for

E-M-F, Ford and Hudson.  
One piece aluminum; immediate shipment subject to inspection.

Detroit Fore-Door Co.,  
66 Fort St. E. Detroit, Mich.

#### DISCO SELF-STARTERS.

Only \$12.50. List price, \$30.00. Guaranteed. Only successful gas starter. Standard equipment on Stevens, Buick, Packard. Great opportunity to have 1913 improvement on your old car.

PARSONS SALES CO.,  
1945 Grand Ave., Kansas City, Mo.

#### DRAGON REPAIR PARTS

We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

**ELECTRIC HORN, \$3.00; \$6.60; STORAGE** Batteries, \$7.50.

Fred Allen Auto Supply Co.,  
1610 Michigan Ave., Chicago, Ill.

**FORD AGENTS—WE MAKE A SPECIALTY** of Dust Hoods to cover top when clashed down, for Model T Ford 1910-1911-1912, 1913 cars. Write for prices. Will save you money. The H. A. Hawes Storm Front Co., Coldwater, Mich.

**FORD FAN BELTS, WOVEN COTTON AND** silk; outlast six regular belts. Postpaid, 75c. Dealers, write. Angler's, Streator, Ill.

#### FORD LIGHTING OUTFIT \$5.50

Includes parabolic reflectors, tungsten bulbs, wiring, switch and free delivery. Truscott Auto Supply Co., St. Joseph, Mich.

**FORD OWNERS: WE WILL GUARANTEE** you a saving of 10% to 15% on Springs, Moulding, Bumpers, Trunk Racks, Robe Rails, or any accessories. Write us today what you require. The Specialty Co., 2220 Calumet Ave., Chicago, Ill.

#### FORD OWNERS AND DEALERS!

You will save trouble and money by installing our timer elevating device.

Ford Parts Specialty Co.,  
1211 Main St., Richmond, Ind.

**FORD OWNERS—YOU CAN INCREASE** the life of your tires 25% by fitting your car with Wire Wheels. Will also improve riding qualities of your car and make it up-to-date. Write Racine Auto Parts Co., Box 86, Racine, Wis.

**FORD OWNERS—OUR SPARE DEMOUNTABLE** wheel cures tire trouble on road. Doctors attention. Write Angler's, Streator, Ill.

#### FORD, HUPP AND MAXWELL

Muffler cut-out, machined ready to attach, including lock, open pedal string and cables, \$1.35. Lincoln Machine Shop, Lincoln, Ill. c

#### FORD T. OWNERS

Foot throttle or accelerators, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

#### FORE-DOORS.

Doors made for all makes of cars. Guaranteed prompt shipment and a very good fit. We have patterns for most every car. F. E. Lortz Co., 9201 Hough Ave., Cleveland, Ohio.

**FOR SALE—THREE WESTINGHOUSE** mercury arc automatic rectifiers in first-class condition. Selling to put in larger charging outfit. Address, Beatty Electric Garage, Quincy, Ill.

**FOR SALE—UNDERGROUND GASOLINE** storage outfit, used one season. For information write to Robt. Furr, Genoa, Ill.

**FOR SALE—30 H. P., 3 CYLINDER, 2** cycle air cooled Speedwell Motor, slightly used but in first class condition; a snap if taken at once; price with coil, timer, and forcedfeed oiler, \$100. 5 H. P. 2 speed Thiem motorcycle in perfect condition and only used as sample machine. A bargain at \$175. Groenig Motor Car Co., Holloway, Minn.



#### More Than Satisfied

"Please change our advertisement to read as per enclosed matter. Run until further notice. We have steadily secured excellent results from our ads in MOTOR AGE and are more than satisfied."

L. D. S.

#### FOR SALE—\$70.00

Four cylinder 4 1/4" x 5" automobile motor, complete with clutch, carburetor and coil, in fine condition. Would be suitable for motor boat. Peter Bros. Mfg. Co., Algonquin, Ill.

#### GUARANTEED BATTERIES.

6 volt 140 Amperes.....\$16.00  
6 volt 80 Amperes.....13.00  
6 volt 60 Amperes.....10.00

The Ampvo Battery Co.,  
1607 Michigan Ave., Chicago, Ill.

#### HUPP OWNERS.

Write for our parts list; save you 1/2 on repair parts.

Autoparts Mfg. Co.,  
Cor. Trombley and Orleans,  
Detroit, Mich.

**IF YOUR CAR IS NEW, YOU SHOULD** use Boyer's "3B" Waterproof Cleaner, Polisher and Preserver. Particulars Free. Boyer Chemical Laboratory Co., 2 East Michigan St., Chicago.

#### KASTNER TIRE AND RIM CO.,

2112 Michigan Ave., Chicago.  
Standard Universal, quick detachable rims in sizes 30x3, 34x3 1/2, 32x4, at \$5.00 a set of four, absolutely new. Also 30-3 one-piece clincher rims at 50 cents each. Send for cut of quick detachable rim and our new rims part catalogue.

#### KEROSENE FOR AUTOMOBILES

Our new Model B uses successfully half and half mixture lowest grades kerosene and gasoline. Satisfaction guaranteed or money refunded. Greatly increased power; very slow speed on high. Starts easy at zero. Special agents' prices. Dept. B.

The Air-Friction Carburetor Co.,  
Dayton, Ohio.

#### LANDAULET BODY.

For any Straight sill. This body is in A No. 1 condition and will prove a bargain to the first purchaser.

Modern Autop Co.,  
607 St. Claire Ave. N. E., Cleveland, Ohio.

#### LAUGH AT TIRE TROUBLE

Use Standard Tire Protectors. Tire expense reduced two-thirds. Write today for our valuable accessory catalogue.

New York & Brooklyn Auto Supply Co.,

1717-1719 Broadway, New York.

#### LIGHT—IF YOU USE AN ACETYLENE

Gas Generator on your automobile, motorcycle, or motorboat, let us tell you about the White-Light Gas Refiner. It will make your generator reliable and transform your treacherous yellow flame into a clear, white, dependable searchlight. Price \$1.50. Barnard Brass Works, Rockford, Ill.

#### LATEST FORD ROADSTER BODY, \$35.

Tops, curtains included. Mac Innis Bros., Toledo, O.

#### LION REPAIR PARTS

We have on hand a complete stock of repair parts for all models of Lion Cars.

Lion Motor Parts Co.,  
124 N. 3rd St., Philadelphia, Pa.

#### MACHINE SHOPS AND GARAGE—OUR

WELD IT ALL machines will weld perfectly any broken casting that has a melting point. Full particulars on Oxy-Acetylene welding machines sent on receipt of your address. Every machine fully guaranteed. H. D. Prose & Co., Wichita, Kansas.

#### MANUFACTURERS' SALE

50% OFF PURCHASE PRICE.

60 New Ejector Mufflers, each.....\$ 2.50  
Frames 112" and 124" W. B., Straight and Kickup .....\$12.00 to \$15.00  
Frames, unassembled, 112" W. B., Kickup .....10.00  
Wheels, 32 x 3 1/4-34 x 3 1/2, etc., per set .....\$10.00 to \$15.00  
Axles, front and rear, 30 to 50 H. P.  
5 Pass. Bodies, rough and leaded, not upholstered .....\$10.00  
Atwater Kent systems, Broadcloth, odd trimmings, garage flash sign, showcase, running board brackets, spring hangers, starting cranks, rough flywheels, drive shafts a few auto tops, etc.

Ask us for particulars.

Address,

Box D 364, c/o Motor Age.

#### MONEY FOR FORD DEALERS.

Write Today for Our Agency Proposition.

#### EDISON STARTERS.

No More Cranking. No More Broken Arms. The Edison starts car from seat.

Every Ford owner wants an

#### EDISON STARTER.

We Guarantee to Please.

CONSOLIDATED GAS & ELECTRIC CO.  
552-554 W. Lake Street, Chicago, Ill.

#### MR. (FORD) OWNER AND GARAGE MAN

The Townsman Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsman Auto Specialty Co., Mitchell, S. D.

#### NICKEL PLATE YOUR AUTO TRIMMINGS

with Electro-Knickel. Prevents brass from tarnishing, iron from rusting. This is not a silver or mercury wash. We guarantee it plates (without a battery). Price \$1.00, express prepaid. Write for information. Gun Metal Finish Co., 313 Powers Block, Decatur, Ill.

#### PET COCK—FOR INSTANTLY CLOSING

the gasoline line. Fits standard carburetor coupling. Easily attached. Mailed for 60c and dealer's name. Discounts to the trade. Will save its cost every month, besides the convenience. Address Specialties and Tire Department, Twyman Motor Car Company, Columbus, Ohio.



**MORA REPAIR PARTS**  
We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

#### RADIATORS

Built to Order for All Cars. Copper, Fin and Tube Type.

\$5.00 Trade Allowance for old radiator shipped in F. O. B. Detroit.

Ford Model T.....	\$22.00
Ford Model R. S. & N.....	28.00
Hupmobile 1910-1911.....	28.00
Hupmobile 1912-13.....	38.00
Warren 1910-1911-1912.....	35.00
Packards to sample, \$50 to.....	65.00
E. M. F. 30.....	35.00
Flanders 20.....	30.00
Patterson 30.....	35.00
Buick 10-14-32-33.....	30.00
Buick 16-17-19-26-27-28.....	35.00
Hudson 20.....	32.00
Hudson 33.....	40.00
Cadillac 30.....	35.00
Paige 1910-1911.....	28.00
Paige 1912.....	30.00
DeTamble 1910—a few.....	15.00

Aeroplane radiators to Blue Print.  
1,000 Standard motor cycle spark plugs—while they last, 25c each.  
17 in. Niagara folding machine.....\$12.00  
One set 30x2 slip rolls.....20.00  
34 in. P. S. & W. square shears.....35.00

Terms cash with the order or 1-3 with all shipments C. O. D.

**HURON RADIATOR & LAMP COMPANY,**  
253-255 Jefferson Av.,  
Detroit, Mich.

#### RADIATORS—NEW GUARANTEED GOODS

Ford, Model T.....	\$16
Buick Model 10.....	22
Buick Model F.....	25
Chalmers-Detroit.....	20
Everett.....	20
Stoddard-Dayton.....	25

Any other make required at equally low prices.

Times Square Automobile Co.,  
1210-1212 Michigan Ave., Chicago.

RANDOLPH ONE-TON TRUCK MOTORS, shopworn, two cylinder opposed type, 22 H. P.....		\$ 70.00
Four cylinder Cameron air-cooled motor, slightly used.....		60.00
Two cylinder opposed Detamble motor, air-cooled with planetary transmission.....		75.00
Four cylinder Imperial-Milwaukee motor, 45 H. P., complete with magneto, water pump, carburetor.....		190.00
Four cylinder Rutenber motor 7" bore, 8" stroke with water pump, magneto, clutch.....		750.00
Four cylinder Mitchell motor, 35 H. P., fitted with magneto, carburetor, oiler and pump.....		145.00
Two cylinder opposed, Type H motor.....		50.00
50 H. P. American-British motor, new and guaranteed, complete with magneto ready to run.....		300.00
Sears' motor complete with fan, friction clutch disc, carburetor.....		50.00
Two ton truck selective sliding gear transmission, with sprockets and bearings and jack shaft.....		100.00
Demot planetary transmission, new latest ball type.....		15.00
One ton Sheldon Truck Axles, per pair 10 sets, one ton truck wheels with 36x2 Swinchart solid tires, per set of four.....		40.00
3 sets two ton truck wheels, 30x5, per set.....		25.00
Randolph one ton truck, wheels 34x 3 1/2, 17" spokes, 2 1/2" felloes, per set of four.....		20.00
36x4, per set of four.....		25.00
Randolph one ton truck, wheels with Carnegie channels, 34x2 1/2, per set of four.....		8.00
Randolph truck wheels, fitted with Dual tires, 35x4, per set of four.....		60.00
One ton truck springs, each.....		2.50
Auxiliary seats to change your car from five passenger to seven passenger, upholstered, pair.....		12.00
Mechanically operated oiling devices, 3 to 10 feed, per feed.....		1.00
Send for our list of Seconds and Second Hand Tires.....		

**AUTO PARTS CO.,**  
513-31 Jackson Blvd.,  
Chicago.

**OXY-ACETYLENE WELDING AND CUTTING Machine.** The Admiral Welding Machine is built by men who know; large capacity; self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, \$250.

We do expert welding; prices right.  
Admiral Welding Machine Co.,  
1331 Walnut St., Kansas City, Mo.

**TOPS BUILT, RECOVERED AND REPAIRED.**  
C. G. Meyer & Son, Tiffin, Ohio.

**TOURING, ROADSTER, RACING BODIES.** Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

Auto Sheet Metal Works,  
1534 Michigan Ave., Chicago.

**TWO CYLINDER GASOLINE AUTOMOBILE Engine, \$25; Three Speed Transmission and Clutch, \$15, Complete Front and Rear Axles, \$20.** Rowe, Lansdowne, Pa.

**WATER PROOF JET DRESSING FOR Automobile Tops.** Will color the top black and also make it water proof. Write us for price. Autocape Top Co., 2334 Michigan Ave., Chicago, Ill.

1 1/4" D NO. 3 RAYFIELD CARB., \$10.00;  
one H. T. Eisemann Mag., \$15.00; one National L. T. Mag. and Coil, \$15.00; one B No. 3 Stromberg Carburetor, \$9.00; 60 h. p. used Thomas motor, \$125.00. Pope-Toledo parts for sale. Auto Salvage Co., 1436 Wabash Ave., Chicago, Ill.

### Parts and Accessories WANTED

**MAGNETOS WANTED: WILL PAY CASH** for new or used magnetos.

Pellet's Magneto Exchange,  
1463 Michigan Ave., Chicago.

**WANTED — CRANKCASE FOR ROYAL Tourist, 1908 Model, eight-passenger, second-hand.** We buy and sell second-hand parts of any car; let us know your wants. Polk Auto Shop, 1006 McInnis Ave., Hattiesburg, Miss.

**WANTED — FORE - DOOR ROADSTER** body to fit Overland 41, with top. State price and condition. Address Box D 402, c/o Motor Age.

### Cars Wanted

**AUTOMOBILE WANTED—ROADSTER OR** light touring car. Must be first-class shape, priced right and full description first letter. Box 4, Center Junction, Iowa.

#### MY KINGDOM FOR A CAR

160 Acres fine Oklahoma land; level; soil black loam; all fenced; house; at \$20.00 per acre, worth more, but I want a car; what have you in exchange?

A. L. Stone, Texline, Tex.

#### WANTED—AUTOS.

Will pay spot cash for 1912 King or Sampson car, 5-pass., if cheap. Box D 395, c/o Motor Age, Chicago.

**WILL BUY FOR CASH—FACTORY OVER-** productions, obsolete and last year models. We are the mid-West's largest dealers in used cars. No deal too big. Tell us what you have. Mid-West Sales Co., 1820-22 Grand Ave., Kansas City, Mo.

### Ball Bearings

**BALL & ROLLER BEARINGS, ALL TYPES** Distributors of

"F & S" Ball Bearings.  
"New Departure" Ball Bearings.  
"Pressed Steel" Ball Bearings.  
"Standard" Ball and Roller Bearings.  
BALL BEARINGS REPAIRED.  
THE GWILLIAM COMPANY,  
New York—Broadway, at 58th St.  
Philadelphia—1314 Arch St.

### Situations Wanted

**ENGINEER HAS HAD 8 YEARS' EXPERIENCE** in the design of pleasure and commercial cars; is open for engagement. Box D 341, c/o Motor Age.

**AUTOMOBILE ENG. EXPERT DESIGNER** mechanic and executive wants a responsible position. I have proved my ability for 22 years in designing, experimenting with automobiles and other branches. If you have an opening for a critic who gets results, cuts expenses and saves you troubles write to Box D 408, c/o Motor Age.

**GARAGE MANAGER AND SALESMAN OF** wide experience desires to communicate with parties relative to assuming charge of garage in small city. Box D 407, Motor Age.

**POSITION WANTED AS CHAUFFEUR** repair man or salesman. I am a graduate of the practical auto school, but have not had much experience. Address Luey Lamb, New Boston, Ill.

**REPAIRMAN WISHES POSITION; HAVE** had several years of experience; best of reference.  
L. Schaumburg, Milford, Illinois.

**SALESMAN OF EIGHT YEARS OF EXPERIENCE** and of wide acquaintance desires to make connection with a live firm where experience and hard work will be appreciated. Until recently was employed by firm manufacturing medium-priced car as assistant sales manager. Had best of reason for leaving their employ.

Can furnish best of references as to my ability and reliability. Address Box D 337, c/o Motor Age.

**WANTED—POSITION AS CHAUFFEUR** with good family or good shop; first class mechanic and driver; 6 years' experience repairing and driving; at present foreman of first-class garage; married; age 25; no booze or bad habits; good reason for change; \$25 per week to start; the best of ref. Address J. F. McDaniel, Box 417, Blandinsville, Ill.

**YOUNG MAN WHO IS A CAR OWNER** and good driver wishes position as chauffeur for party touring Europe this summer. Willing to go without salary if expenses are paid. Address Box D 397, c/o Motor Age, Chicago.

### Help Wanted

**DISTRICT MANAGERS WANTED FOR** the Northwest, Pacific Coast, South and Southwest to represent a popular priced car of national distribution. Thorough knowledge of territorial conditions demanded. Only experienced men will be considered. Address, Box D 383, c/o Motor Age.

**ENGINEERS, SUPERINTENDENTS,** Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—20th Year—Chicago.

**WANTED—PURCHASING AGENT WITH** experience; must know the market thoroughly. Factory located in New York City, producing modern six cylinder car. Box 48, Larchmont, N. Y.

**45 HIGH GRADE MEN WANTED** For all lines of the automobile industry. The Toledo Engineering Agency, Toledo, O. H. L. Croy, M. E., Mgr. Member S. A. E.

### Salesmen Wanted

**WANTED — SALESMEN TO DEMON-** strate new patent article; good salary. Simplex Vulcanizer Co., Omaha, Neb.

**WANTED—SALESMEN TO SELL THE** most up-to-date line of automobile accessories manufactured. One of the articles absolutely brand new. Proposition strictly a commission one and exclusive state rights will be given to people who can get results. A Money Maker. Address Box D 404, c/o Motor Age.

## Agency Wanted

**PROGRESSIVE CONCERN MANUFACTURING** full line of rubber stocks for Tire Repairmen wants responsible and active sales agents in Chicago for an exclusive western territory. References required. Address Box D 387, c/o Motor Age. s

### STODDARD-DAYTON AGENCY PROPOSITION

The new Stoddard-Dayton automobiles are now distributed direct from the factory. The best and fairest agency offer ever written is now ready for representatives in every locality. The 1913 line includes roadsters, touring and closed body cars, ranging in price from \$1,350 to \$5,000. Write at once for our liberal offer. State territory desired. The Stoddard-Dayton Sales Co., Dayton, Ohio.

### WANTED.

Agency for an automobile truck and auto manufacturer that will furnish demonstrator to agent. Thos. J. McEvoy, New Orleans, La.

## Wanted—Agents

**MANUFACTURER'S AGENTS ARE REQUESTED** to correspond with us in reference to exclusive representation to jobbers and manufacturers. Proposition attractive. Advise lines now representing, territory covered and how often. Sioux City Machine & Tool Co., Sioux City, Iowa.

## Business Opportunities

### A BUSINESS PROPOSITION

We are making a successful up to the minute car, which has stood the test of years. Need more capital than can be had locally. Can you furnish it? If interested write at once. Box D 405, c/o Motor Age. a

### ATTENTION

The Toledo Automobile Devices Co., of Toledo, Ohio, having all it can do to take care of its own patent accessories, offers for sale a couple of valuable patent devices, suitable for manufacturing on a small or large scale, showing several hundred per cent profit. For particulars address

THE TAD COMPANY,  
Toledo, Ohio.

**FOR SALE: AN IDEAL FACTORY, SUITABLE** for furniture, automobile or piano manufacturing, within one and one-half hour of Detroit, Michigan, on the Grand Trunk and Pere Marquette Railroads. Brick and heavy mill construction. Perfect sprinkler system, and fully equipped with mill machinery. Nothing better in the country. For full particulars write to E. J. H., 25 Jewett Avenue, Buffalo, N. Y. c

**FOR SALE—A WELL ESTABLISHED,** leading taxicab business at a bargain, if taken at once. Located in a city of 140,000 in southern Ohio. Owner desires to sell because of other business interests requiring his time. Will sell for part cash and weekly payments. A chance for the right man. Will clear \$5,000 a year after deducting depreciation and all expenses. Write for particulars. Address Taxicab Company, c/o Motor Age, 910 Michigan Ave., Chicago. s

**FOR SALE—FULLY EQUIPPED REPAIR** and garage business. On Waubansia's Trail. No competition and plenty of cars. Have other business to look after. Box D 406, c/o Motor Age. m

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34 x 4	.....	17.25 4.65
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Size.	Our Price.	Size	Our Price.
	1-3 off list.		1/2 off list.
32x4	.....\$15.00	36x4 1/2	.....\$23.00
34x4	.....17.00	36x5	.....27.00
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32x3 1/2	.....16.00	34x4 1/2	.....27.00
30x4	.....17.50	35x4 1/2	.....28.00
32x4	.....20.00	36x4 1/2	.....29.00
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34x4	.....22.50	36x5	.....31.50
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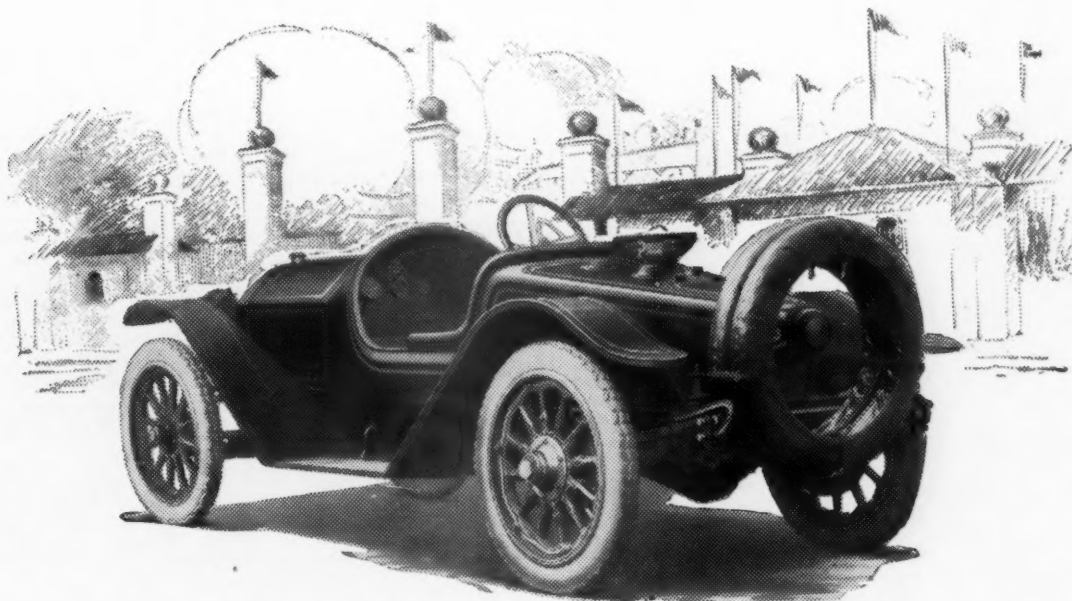
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To Be Trouble  
If You Don't.**

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BRIDGEPORT, CONN.

We also make  
Duplex and Ray-  
mond Brakes and  
Gyrex the Mixer.



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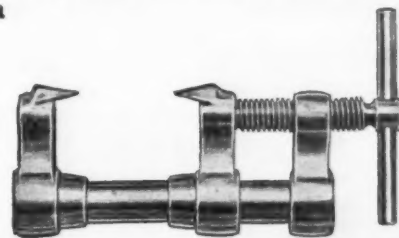
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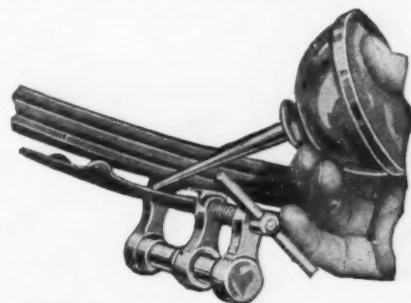
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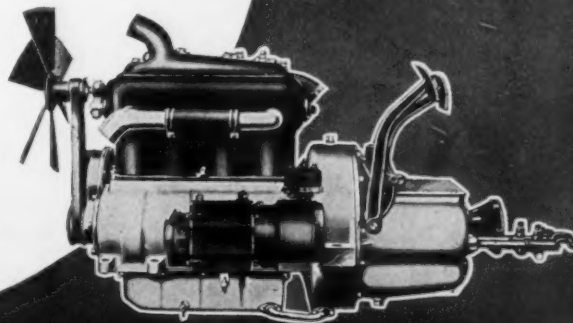
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